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ELECTRIC RAILWAY JOURNAL

Thirteenth St., Augusta, Ga.
An installation of the Carey System of Track Insulation by Augusta-Aiken Ry. and El. Corp.
W. H. Wise, City Engineer.
D. B. Bell, Eng.
M-W Augusta-Aiken Ry. & El. Corp.

Better Tracks and Streets for Augusta, Ga.

Augusta's street railway company, car-riding public, motorists and taxpayers are all to profit by the use of the Carey System of Track Insulation.

In the re-paving of Thirteenth St., between Green and Ellis, Carey Elastite Rail Filler is used in the rail and Carey Elastite Rail Cushion between ties, absorbing the objectionable noise of rail vibration, the destructive traffic-impact, and making the track water-tight.

This cushioning of the rails means quiet, smooth travel for car-passengers, reduced expenditure for pavement repairs and less wear and tear on street cars and automobiles.

Send for complete information and samples.

THE PHILIP CAREY COMPANY
53 Wayne Ave., Lockland, Cincinnati, Ohio

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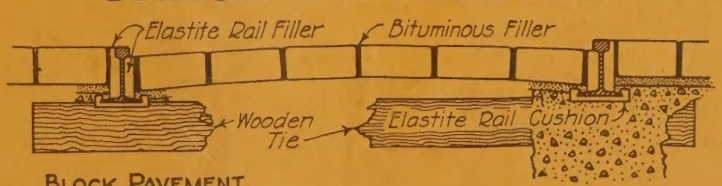
Elastite Rail Filler Is Easy to Install

a tap of a mallet holds it in the web of the rail

Carey Elastite Rail Filler is a composition of specially-tempered asphalt and fibre which is used as a resilient cushion between the rail and the pavement absorbing traffic-impact, rail vibration and traffic-noise. It is preformed to fit any rail-section and is readily shaped on the job to fit any track-curve. It is unaffected by moisture or temperature changes and is enduring under all service conditions.

Carey Elastite

SYSTEM OF TRACK INSULATION



BLOCK PAVEMENT

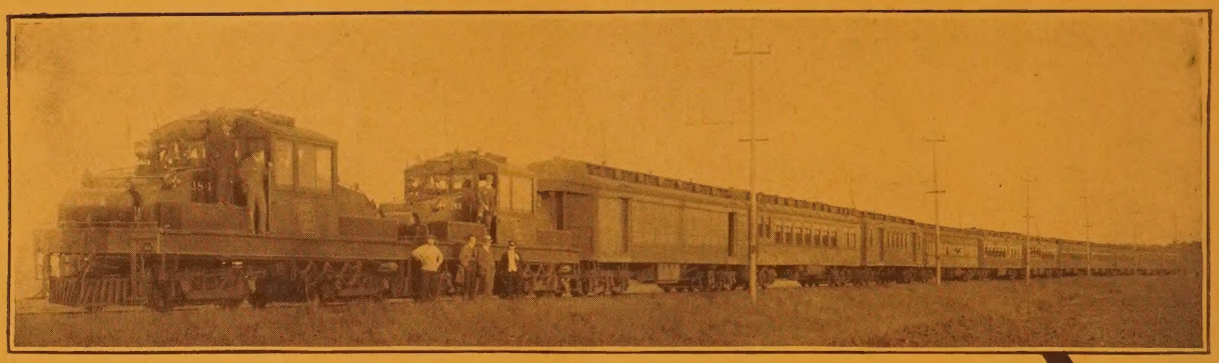
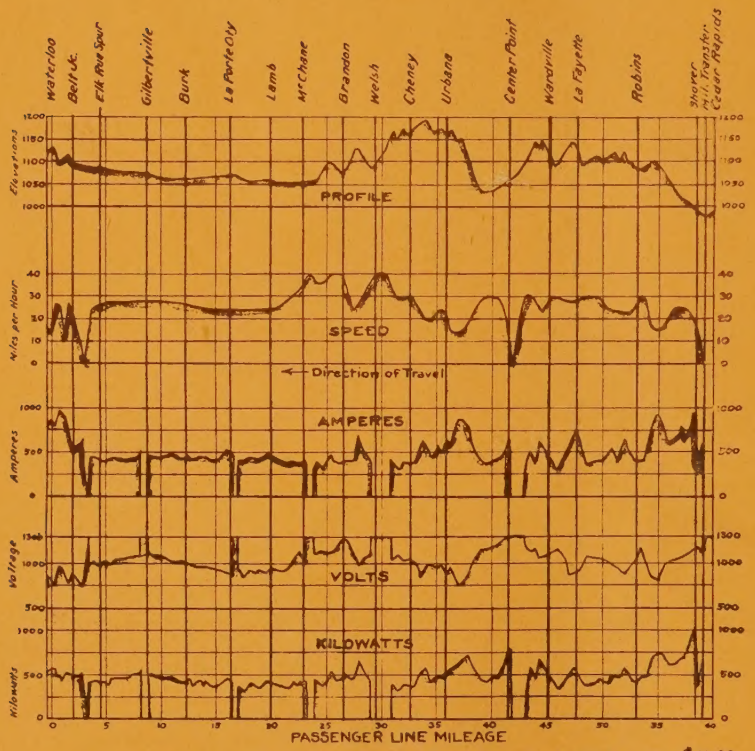


Figure It Out!



Average Grade, + 0.044%	Total Kilowatt Hours, at Car, 1191.	Total Coal Pile Power Cost $11.00
Average Speed, 24 m.p.h.	Weight of Train (Not incl. Loco.) 850T.	Motive Power, Two 180 Cl. Locos.
Average Amperes, 519 (at car)	Watt Hours per Ton-Mile, at Car 23.7	Trolley and Rail Losses 23.2%
Average Voltage 999 " "	" " " " " " Pow. Ho. 36.8	Trans. & Conver " 12.3%
Average Kilowatts 516 " "	Coal Pile Cost per Ton-Mile 0.021¢	Approx Total Losses 35.5%

PERFORMANCE DIAGRAM
11 CAR STEEL PASSENGER TRAIN
CEDAR RAPIDS TO WATERLOO
MAY 21, 1924.

This is a performance diagram of the 850 ton, eleven-car excursion train of the Milwaukee Association of Commerce between Cedar Rapids and Waterloo, Iowa, on May 21, 1924, hauled by two standard 60 ton Baldwin-Westinghouse locomotives over the Waterloo, Cedar Falls and Northern Railway.

Ten interurban railways, operating a total of 56 locomotives, report an average figure of locomotive maintenance of 6.25 cents per locomotive mile.

If these figures applied to freight interchange service with connecting steam roads, would it be profitable?

FIGURE IT OUT!

BW

The Baldwin Locomotive Works
Philadelphia, Pa.
Westinghouse Electric & Manufacturing Co.
East Pittsburgh, Pa.

W WESTINGHOUSE ELECTRIC

Baldwin-Westinghouse

New York, Saturday, January 24, 1925

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Company, Inc.

HARRY L. BROWN, *Editor*

Volume 65
Number 4

"What Would You Do?"

OUT of the welter of editorials printed every day in the newspapers throughout the country there emerges every so often a message so poignant, so forceful, that it deserves wide circulation. A writer in the Philadelphia *Public Ledger* has risen to the occasion in an editorial about the fellow prone to kick about street railway service even in the face of those trying conditions that often beset the street railway management. The excuse for his comment was the recent severe storm in the East that played havoc with transportation everywhere and resulted in delays, disorder and general disruption of service. His plea is for fair play, the boast of the average American. He does not wonder that patience sometimes breaks under the strain of transportation delays, but he points out that the time is one "for philosophical endurance and for that give-and-take without which intercourse with our kind would often be intolerable."

The question that is asked is "What would you do?" The editorial is significant because its every line reflects the attitude which the writer asks his readers to observe. The United Railways & Electric Company, Baltimore, has reprinted it for distribution among its patrons, asking for their suggestion. The editorial, reproduced in full elsewhere in this issue, lends itself to a purpose of this kind.

Constantly increased use is being made by electric railways of similar expressions of editorial opinion. The particular editorial, less than 400 words in length, not only is fair in its presentation, but in it the writing virtues of clearness, force and simplicity are so compounded as to commend it to the thoughtful consideration of car riders everywhere.

Must the Railway Remove Snow from the Whole Street?

IN ONE of the large cities a very severe snowstorm recently brought all traffic virtually to a standstill. The manner in which the local railways suffered was particularly trying. The companies spent large sums of money to keep the tracks open. While their plows were effective, they piled the snow up outside the tracks and, of course, all vehicles traveled on the track area.

This unfortunately is the usual course of events, but in the case referred to the storm was so heavy that as this issue of the paper goes to press, three weeks after the storm, the snow at the sides of the streets on many of the car lines has not yet been cleared away by the city. Thus vehicular traffic has continued to occupy the trackway and has had the effect on railway schedules instanced by the following typical line.

Under normal conditions a car on this line makes 14 round trips of 40 minutes elapsed time each within the working day of a crew. Now, three weeks after the storm, a crew is making six round trips a day and the elapsed time per round trip is from 2 to 2¼ hours.

In a way it seems out of place to suggest adding further to the burdens already heaped upon the railway for its use of the streets. Yet such a serious slowing up of the service with its consequent large loss of revenue, gives rise to the question of whether it would not pay the railway to have special equipment to assist the city in removing the accumulation of snow at the sides of the streets along car lines. Some companies are already doing this through the use of specially equipped motor truck plows and snow loaders, but most of them have hesitated to engage in such extra work.

In the absence of such snow removal equipment, the tracks might almost as well not be cleaned either, because the cars are of no value to the public if their movement is reduced to a speed considerably below that of walking. In the case in point, the cars have been virtually empty much of the time, though ordinarily they are well patronized with a headway of about 2 minutes.

Making Transportation Extensions Pay Their Own Way

ALMOST everybody realizes today what a heavy price American electric railways have paid and are still paying for the old policy of building extensions almost as fast as residents and real estate interests demanded them. The price was made all the heavier through the policy of granting the same flat fare for the longer ride into thinner territory.

A few years ago, Cleveland, as the leader in service-at-cost, called the turn on this way of adding to the landowner's unearned increment at the expense of the general car-riding public by insisting that the persons benefited by an extension must be willing to help find the money for it through purchase of securities. More recently, Baltimore has gone still further with realty developers by asking not for assistance in finding capital but for a guarantee against operating losses over a period of years. In Madison, Wis., a similar guarantee against loss to the railway was provided in 1919 by a manufacturer who had built a new plant beyond the end of the car line.

Now the Department of Street Railways, city of Detroit, gives acceleration to this tendency with the announcement of the Baltimore principle as a definite policy for all demands for extensions. This may surprise those who believe that a municipally-owned transportation system is necessarily obligated to extend and extend without regard to the effect on its finances. Unlike a private company, the city gains an increase

in tax values as a partial or complete offset to operating losses on the transport facilities that produce the increase in such values, but that is not a sufficiently good reason to throw financial caution to the winds and give the land speculator something for nothing. From a city planning standpoint, also, the idea suggests itself that through control of the transport body and the latter's surplus revenues, etc., the municipality can exercise praiseworthy pressure as to the character of new housing developments.

While the Detroit traffic survey article in this issue gives many further particulars, one thought should be put forward here in connection with these surveys: The Department is actually putting it up to the people who will do the paying to decide for what they will pay!

Not What Is Heard, but What Is Used, Is Important

ONE of the speakers at the New York Electric Railway Association meeting this week, W. W. Paige, emphasized effectively a point that might be taken to heart by all railway men. The value of the meetings to the individual is not in listening to the speakers, not in taking part in the discussions, nor even in presenting a paper. Neither is it in what is retained after the delegate gets back home. All of this is merely for the edification of the individual. But what really counts is what portion of what is learned is actually put into use.

The papers at this meeting were well chosen and well presented. The discussion was above the average. Moreover, practical topics were taken up that should prove an inspiration to those who attended, and also to those who read the report of the sessions in this issue. Let each person see to it that he digests the matter he has heard or read—and sees how much he can use effectively on his own property.

Light-Weight Cars Solve Difficult Interurban Problems

MODERNIZATION of interurban railway rolling stock was a topic of more than passing value taken up at the midwinter meeting of the New York Electric Railway Association held Jan. 22. The papers on recent types of light-weight interurban cars and the discussion which followed showed that there are great possibilities from their use in building new passenger business and reducing operating costs.

An important point is that the old idea that a minimum weight of 1,000 lb. was necessary for each mile per hour of maximum speed perhaps does not apply any more. Cars with not more than 75 to 80 per cent of the weight dictated by this rule are now operating with complete success at speeds of 50 to 60 m.p.h., according to one of the speakers.

The use of safety devices similar to those developed for city service have made it possible on some lines to operate these light-weight cars with one man. Combining a reduction in labor costs with lowering of other operating and maintenance costs, it has been found feasible to give much more frequent service, and so to attract riders who would not consider the long waits necessary with the heavier cars.

This is a development that merits attention on many other interurban systems, as in numerous cases seemingly hopeless operating situations may be retrieved and service retained where otherwise the property would have to be abandoned.

Divided Opinion Over Future of Boston Elevated

APPARENTLY a fight impends in the Legislature as to the future course of the state with respect to the operation of the Boston Elevated Railway. The period of public control expires in 1928. With this in mind a recess committee of the Legislature has been considering the future of that property and it has just reported in a divided opinion with a 5 to 4 vote.

The majority report recommends that no action be taken by the Legislature this year on the matter, pending further recess study of the whole problem; that no authority be extended the public trustees to obtain further capital and that the question of further additions and improvements be held in abeyance for another year as well as the matter of the continuance of public control. The salient feature of the minority report is that it recommends the immediate enactment of legislation to extend the period of public control twenty years. The majority says little can be done in the way of increased facilities or extensions without a further increase in local fares, if not also in the basic fare now fixed at 10 cents. For these reasons the majority believes that any increased capital expenditures should be made only with the utmost caution. The minority says it sees no reason for drawing such a conclusion from the present condition of the finances of the Elevated. With it all there is involved the question of providing a comprehensive metropolitan transit plan.

The reports and everything pertaining to the subject will be referred by the Legislature to the committees on metropolitan affairs and street railways, sitting jointly. Senator Warren, who signed the minority report, is chairman of the metropolitan affairs committee, and Representative Richards, also a signer of the minority report, is chairman of the street railways committee for the House. It is argued that this situation will likely result in a favorable report on the present minority report. The report would then go to the House Ways and Means committee of which Senator Shattuck, who wrote most of the present majority report, is chairman. It is believed he would fight to have that committee substitute the recommendations of the majority report.

This Boston situation is of wide general interest because in effect the merit of the state trustee plan of operating local railway systems is the issue. The outcome will be to determine whether the present plan will continue, give way to complete public ownership and operation, or revert back to complete private operation.

Not a Straphanger System

THE Denver Tramway Company has removed all straps from its car bodies on both city and interurban lines. This has been done in connection with increased service to impress upon the public that this was not a straphanger service but that the aim of the company was to provide a seat for everyone. Of course it is impossible to do this in the rush hours, and standees then can take hold of the handles on the car seats, all longitudinal seats having also been done away with. But there is something to the public psychology obtained from this removal of the straps.

Surveying Suburban Traffic Wants

Detroit Department of Street Railways Now Determining Market for Trackless Trolley or Motor-Bus Extensions in Outer Areas—Choice of Transit Means and Guarantee Against Loss Put Up to Parties Interested—Careful Survey Methods Used to Estimate Revenues and Expenses

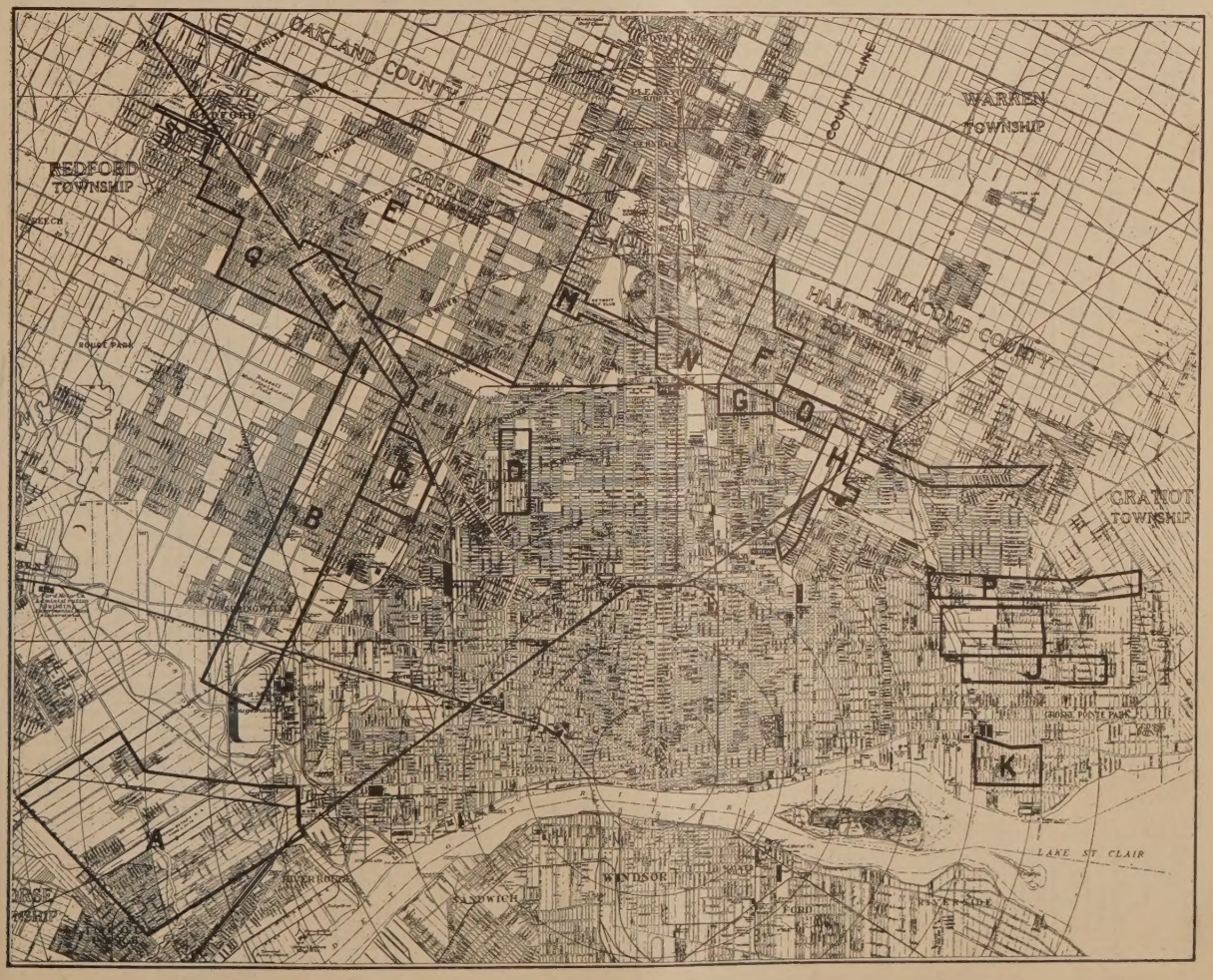
ACCORDING to the charter of the city of Detroit, its Department of Street Railways may, upon the consent of the local suburbs involved, extend its transportation service to points 10 miles beyond the municipal limits. During the first year or two, the department was too much occupied with the rehabilitation of the acquired system to meet requests for service from the outer districts, but with the worst of this work behind it the management is now able to give attention to the expansion foreseen in the charter provision.

If the department were to believe the enthusiastic forecasts of the realtors, the mileage of the system would increase by leaps and bounds. However, so long as the municipal street railway is conducted on a self-sustaining basis, progress must be made somewhat more cautiously. For this reason and because of the possibilities of using trolley, motor bus or trackless trolley for different situations, the Department of Street Railways has undertaken to solve the problem of extensions in a more thorough manner than has been customary in the past.

The plan is simple. Without drawing upon outside aid or adding largely to its operating expenses, the department is conducting surveys of district after district to determine three things: First, the market for transportation; second, the kind of transportation desired; third, the willingness of the local public to meet the cost of such transportation. The procedure is outlined in the following paragraphs.

Survey Staff Is Organized

On the map of Detroit and environs published herewith have been drawn the outlines of the different districts "A" to "Q" surveyed to date. It will be noted that they are of all shapes and sizes, aside from



Map of Portion of Detroit Suburbs Showing Areas in Which Traffic Surveys Are Being Made

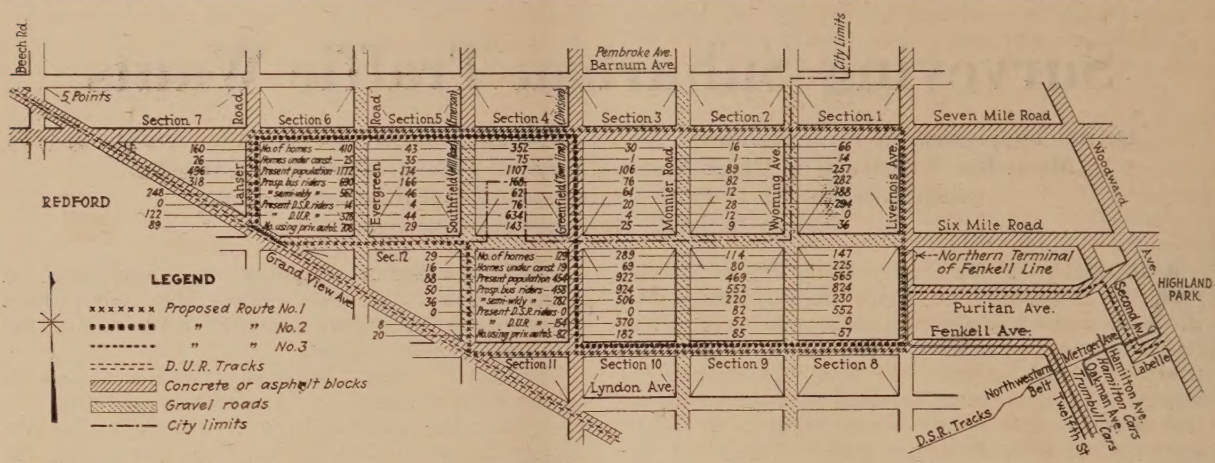
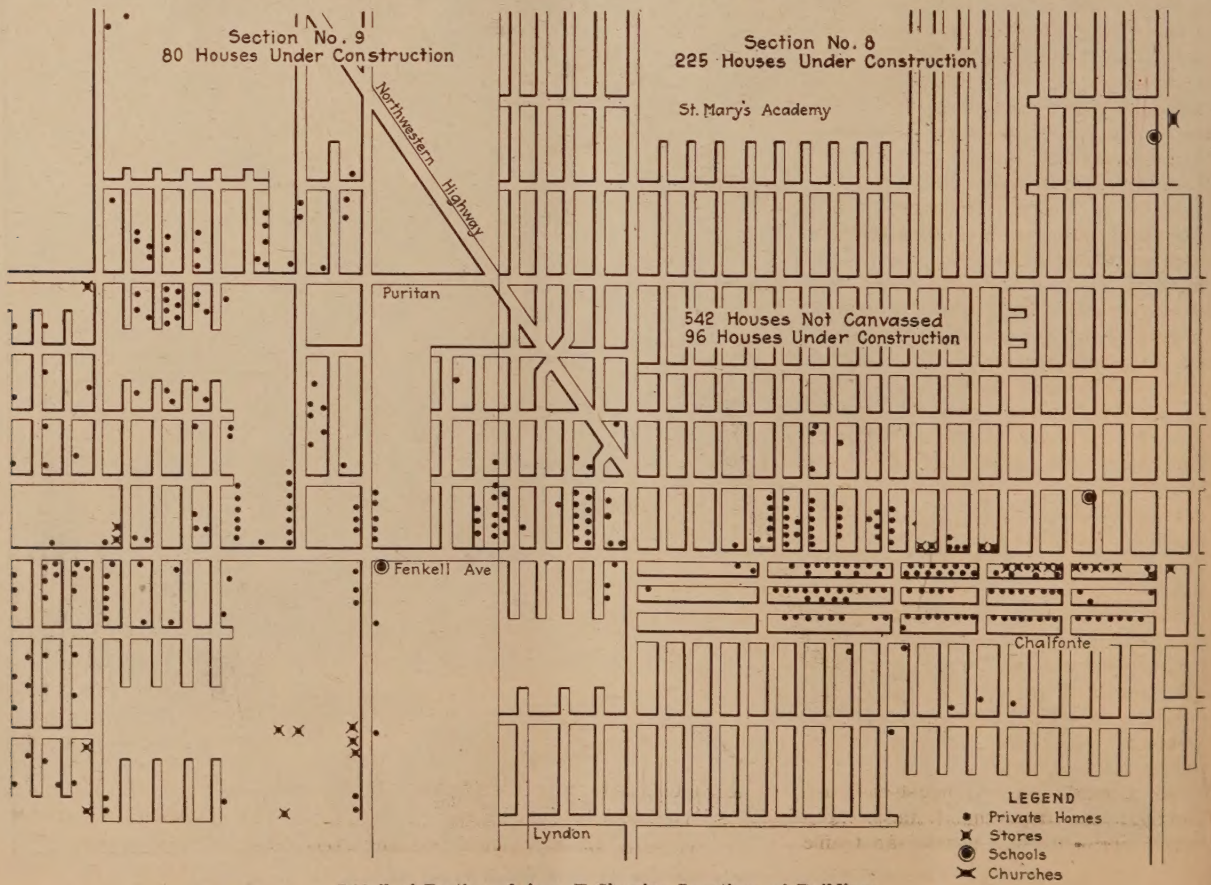


Diagram Used for Summarizing Results of Traffic Survey of College Park and Grand River Association Districts. The Sections Are 1 Mile by 1¼ Mile

political overlaps. Each survey was undertaken at the request of interested individuals or associations in the territory with a D. S. R. traffic survey crew selected to make a house-to-house canvass. These crews have been drawn from the staff of the supervisor of traffic, from the electrical engineering division, from chauffeur forces—in fact, from any department where men of the right class were available. All of these investigators were placed under the direction of Frank Peppler, who acted as chief of the survey and as the usual speaking representative of the department at meetings and discussions with those who had urged extension of service to their territory.

One of the most detailed canvasses was that made in area E on the map, which is bounded by Seven Mile Road, Livernois Avenue, Fenkell Avenue and Grand River Avenue, an area of approximately 21 square miles. Through the economical methods employed by the department and the co-operation of the College Park and Grand River Associations, which are in the eastern and western parts of this district, the survey cost only $50 per square mile. As the methods followed were typical, an account of them will be given:

In the spring of 1924 these associations broached the matter of a conference on service. The suggestion was then made that the businesslike way to look into



Detail of Portion of Area E Showing Locations of Buildings

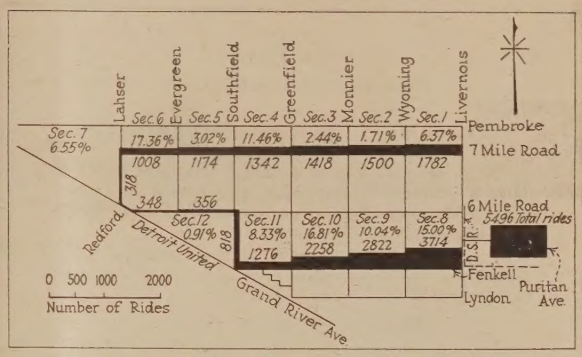
the matter would be to make a detailed survey. Thereupon, the department placed in the field a crew of six to eight men with three or four automobiles. These men made a house-to-house canvass, carrying with them a letter from Ross Schram, secretary (now general manager), and a short questionnaire, which are reproduced elsewhere. The questionnaire asks for the number of adults and children in the residence; the number of daily riders and the times they ride; the lines then used; the particular boarding places that would be used if routes were installed on certain streets; whether use is made generally of the personal automobile, motor bus, Detroit United Railway or the Detroit Municipal service.

In this particular case, trackless trolleys had been discussed. This accounts for the specific mention of trackless trolley buses in Mr. Schram's covering letter. As a matter of fact, the realty interests had expressed a preference for trackless over gasoline buses in the belief that the presence of a "dug-in" transport route would be more helpful in selling lots and houses than a mobile motor-bus route. While the department had no special choice in the matter, it was considered good policy to have every canvasser carry with him a photograph of a trackless trolley so that the householders would know just what they were voting for. This area, by the way, has one gasoline bus which gives rather sporadic service and so inclines the public toward something that is more tangible.

The field check covering the number of houses built or under construction in this area E was completed in about 10 days. One of the maps covers part of the area E, showing how the settlement data were tabulated under the headings of "private homes," "stores," "schools" and "churches." In cases where the houses were too numerous to spot separately, a number was used. From this information and from the answers to the questionnaire, there was prepared a corresponding locality map on which are shown by square miles, in relation to the proposed and existing routes, the number of homes in service, of houses under construction, present population, prospective daily bus riders, prospective semi-weekly bus riders, present Detroit United riders, present Detroit Municipal riders and present private automobile users.

In addition to these data, further graphs were prepared to show the expected densities of traffic along the streets corresponding to the proposed routes. One of these graphs is reproduced herewith. Incidentally, these graphs show how far most of the residents now have to travel to the existing trolley facilities of the Detroit United and Department of Street Railways.

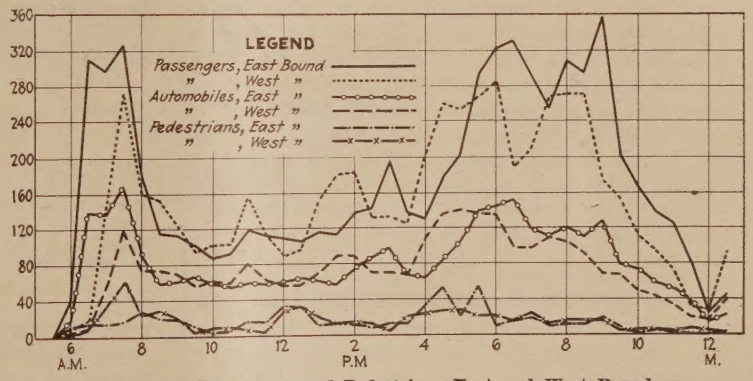
As a check on the house-to-house canvass, the department tallied the actual car, auto and pedestrian traffic



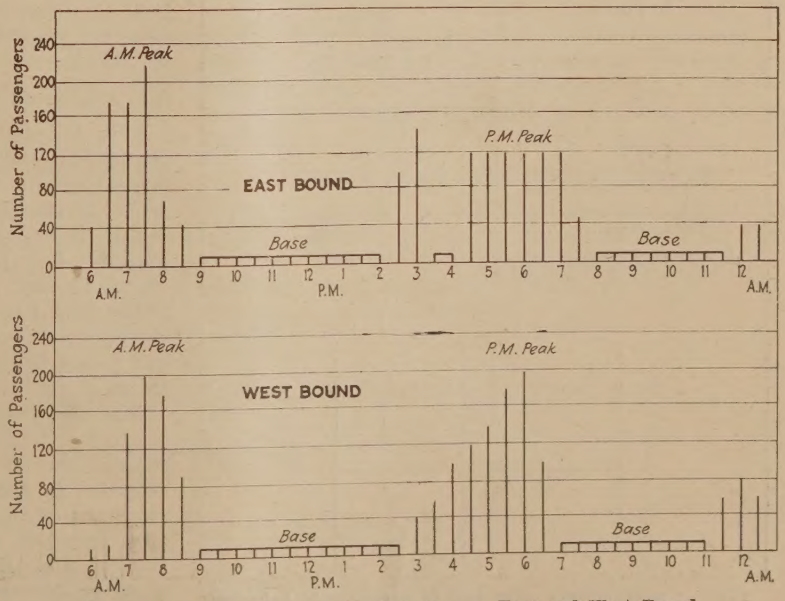
Estimated Density of Traffic Along Proposed Route No. 1
Large figures indicate prospective daily riders, and per cents indicate relative number of riders from each section

by half-hour periods on Fenkell just west of Livernois Avenue, as summarized in one of the charts. A similar summary was made for Seven Mile Road just west of Livernois Avenue. The automobile graph covers passengers.

When the foregoing data were submitted to the associations interested, the latter suggested study of the possibilities of a third route, viz., a line tying in with the Livernois route at Puritan, extending along Puritan



Automobiles, Passengers and Pedestrians East and West Bound on Fenkell Avenue Just West of Livernois Avenue



Tentative Service Chart for Fenkell Avenue, East and West Bound

CITY OF DETROIT
Department of Street Railways

TRAFFIC SURVEY—NORTHWESTERN DISTRICT

The Street Railway Commission has been asked to make a complete survey of the residences in this vicinity for the purpose of laying out routes for the operation of trackless trolley buses.

In order to have complete and accurate data, the commission will appreciate your answering the questions asked by its representative.

BOARD OF STREET RAILWAY COMMISSIONERS,
ROSS SCHRAM, *Secretary.*

May 21, 1924.

Letter from Street Railway Management Transmitting Questionnaire

and down Second Avenue to LaBelle, to terminate at the Highland Park plant of the Ford Motor Company. This is designated as Route No. 3 in the map.

The next step was to make an approximation of the relative costs of gasoline and electric bus service for Routes 1, 2 and 3 in area E. The figures are presented in an accompanying table. They are based on general experience in a variety of places and include the following assumptions: 19½-hour service; 50 per cent standees in rush hours; power cost either 2.5 cents per kilowatt-hour or 2.6 cents per mile (6 miles per gallon) for gasoline. The annual gross expenses are higher for the gasoline bus, but not enough to suggest any noteworthy superiority of the trackless trolley on this account. The figures do not attempt to cover a possibly greater earning power of the more flexible gasoline bus that might offset the higher over-all cost. As part of this study, the department has conducted power demand tests of

TRAFFIC SURVEY—NORTHWESTERN DISTRICT

Date 192

Name ..... Address .....

Near .....

Number of adults in residence .....

Number of children in residence .....

Number of present daily riders ..... Time per day .....

.....

.....

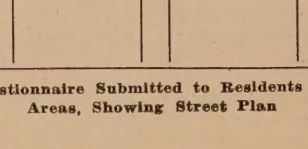
Lines used at present .....

Number who would use line on Seven Mile Road, Redford to Woodward Avenue .....

Number who would use line on Fenkell, Grand River to Livernois .....

In traveling to and from Detroit at present, what facilities are used? (D.S.R.—D.U.R.—Bus—Private Car) .....

Representative .....



Form of Questionnaire Submitted to Residents in Suburban Areas, Showing Street Plan

one and two-motor trackless trolleys. These will be described in a future article in this paper.

It is of interest to add here that later the Grand River Association asked that like studies be made in area Q, as already done for C, D and E, but in this instance a motor-bus catalog was added to the equipment carried by the interviewers to permit the public to see just what they would get with either trackless trolley or motor-bus operation.

Tentative service charts were prepared for Fenkell Avenue east and west bound and on Seven Mile Road east and west bound on the assumption that the service

DETROIT SURVEY, SHOWING INVESTMENT AND OPERATING COSTS FOR TRACKLESS TROLLEY AND GASOLINE BUSES ON SAME ROUTES

	Route 1		Route 2	
	Trackless Trolley	Gasoline Bus	Trackless Trolley	Gasoline Bus
Investment	$349,439	$211,000	$255,857	$173,000
Fixed charges	50,979	40,343	37,657	33,553
Operating expenses	159,279	178,240	112,062	125,413
Annual gross expense	210,258	218,583	149,719	158,966
Annual gross expense to provide sinking fund to retire bonds in 25 years at 5 per cent compound interest	217,589	223,004	155,080	162,591
Injuries and damages reserve (based on Detroit Motor Bus, 1923) $5.20 per 1,000 passengers	9,708	9,708	7,394	7,394
Buses required	20	20	16	16
Annual passengers	1,866,990	1,866,980	1,421,980	1,421,980
Base headway, minutes	15-20	15-20	15	15
Peak headway, minutes	5	5	7½	7½

TRACKLESS TROLLEY ON PURITAN, LIVERNOIS TO SECOND, AND SECOND TO LA BELLE

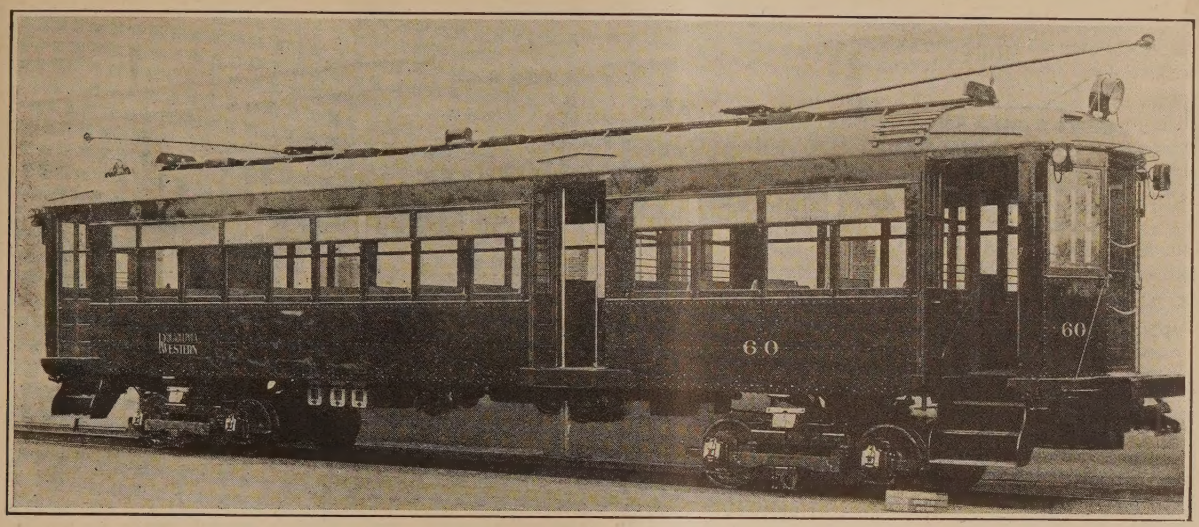
	Route 3	
	Trackless Trolley	Gasoline Bus
Investment	$43,246	$19,750
Fixed charges	6,229	4,017
Operating expenses	14,336	16,040
Annual gross expenses	20,565	20,057
Annual gross expenses to provide sinking fund to retire bonds in 25 years at 5 per cent compound interest	21,471	20,163
Number buses required	2	2
Annual passengers	Not estimated	

would be conducted with trackless trolley buses. The chart for Fenkell Avenue is reproduced. However, the interested associations named have not yet come to a decision as to trackless or gasoline bus as that is partially dependent on the ultimate routes and these in turn are dependent to some degree on the character of paving.

EXTENSIONS TO BE FINANCED ON SERVICE-AT-COST BASIS

It is obvious that the Department of Street Railways cannot undertake to finance and build immediately the large number of extensions desired, more particularly those developments which are being pushed by real estate interests in advance of normal, contiguous growth. For this reason the management has gone on record to the effect that a portion of the pioneering losses should be borne by those who will benefit from the enhancement of property values. The College Park and Grand River Associations have shown a disposition to agree with this idea.

The policy of the D. S. R. in having those most interested in extensions into new territory help pioneer the cost both of construction and operation is very ably seconded in the speeches made by Ezra B. Whitman, chairman of the Public Utilities Commission of Maryland, and L. F. Eppich, past-president National Association of Real Estate Boards, respectively, at the last A. E. R. A. convention. (Pages 596 and 628 of ELECTRIC RAILWAY JOURNAL for Oct. 11, 1924.)



This Philadelphia & Western Car Is Divided Into Two Compartments. Center Doors Without Steps Are Provided

Light-Weight Interurban Car Has Cabinet Control

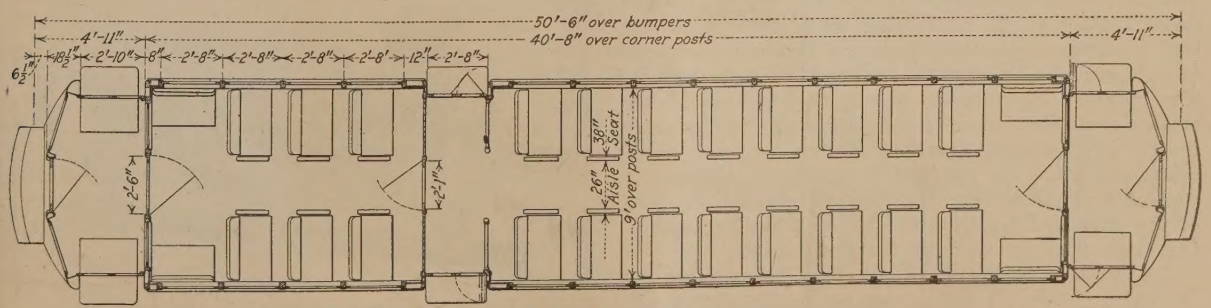
A Sample Car Being Tried Out on the Philadelphia & Western Weighs 57,000 Lb. and Seats 56 Passengers—Center Doors Without Steps Are Used at Flush Platforms—Automatic Control Equipment Is Designed to Operate in Trains with Other Control

A LIGHT-WEIGHT car with all-steel body has recently been placed in interurban service by the Philadelphia & Western Railway between Philadelphia and Norristown, Pa. The car is 50 ft. 6 in. over the bumpers and 40 ft. 8 in. over corner posts. The interior is divided into two compartments at a small vestibule with side doors for entrance and exit, in addition to the end doors. These side doors are used at stations provided with flush platforms, which are installed at most of the stations on the road. Cross seats 36 in. wide are used throughout except for four longitudinal two-passenger seats at the ends of the car. A width over posts of 9 ft. gives an aisle width of 26 in. The main passenger section seats 38 and the smoking compartment 18, making a total of 56. The seats are upholstered in cane. The car was built by the J. G. Brill Company, Philadelphia, and Brill light-weight trucks are used. The car is propelled by four Westinghouse 535-B 60-hp. field-control motors.

All doors are of the folding type, opening outward and operated by National Pneumatic door engines, controlled by individual air valves located adjacent to the door. The car is heated by Consolidated Car Heating Company cross-seat heaters with thermostatic control. The interior is lighted by a single row of lamps down the center of the car, with two lamps at the side doors, one on either side of the aisle. The center lamps are of 72-watt size, while the two door lamps are 36 watts. The lighting fixtures are Electric Service Supplies compensated type, with shades. Details of the equipment and construction of the cars are given in the table on page 134.

Cabinet Type Control Has New Features

The importance of having the control equipment readily accessible, dry, clean, warm and relatively safe at all times led to the choice of Westinghouse double-end, electro-pneumatic, cabinet-type equipment. All but



A High Floor Car with Both End Platform and Center Doors

four pieces of the control equipment are mounted on a panelboard in a fireproof cabinet at the end of the car, with doors opening from the platform. These four parts, which are hung from the car underframe, are the fuse box, main grid resistor, controller resistor, and line switch. The parts of the equipment mounted on the panelboard include the electro-pneumatic unit switches, main and auxiliary knife switches, overload trip relay, reverser, motor cut-out switch and control cut-out switch. The panelboard equipment is mounted on a steel framework inclosed in an asbestos-lined metal cabinet, which extends from the floor to the canopy.

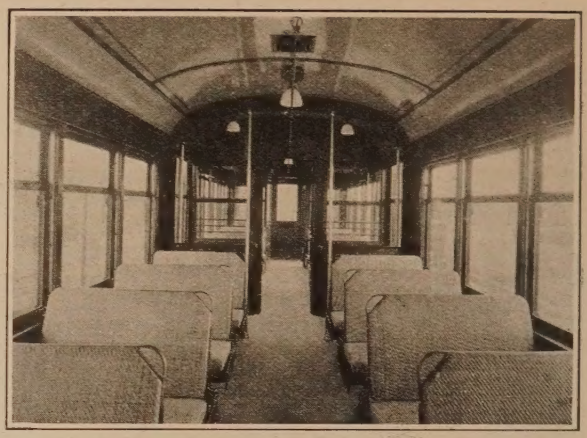
EQUIPMENT AND DIMENSIONS OF PHILADELPHIA & WESTERN INTERURBAN CAR

Number of cars ordered	One (sample)
Date of delivery	Oct. 27, 1924
Builder of car body	Brill
Type of car	Closed interurban passenger
Seating capacity	56
Total weight	57,000 lb.
Bolster centers, length	30 ft. 6 in.
Length over all	50 ft. 6 in.
Truck wheelbase	6 ft.
Width over all	9 ft. 1 in.
Height, rail to trolley base	14 ft. 6 in.
Body	All steel
Interior trim	Mahogany
Roof	Arch
Air brakes	Westinghouse
Axles	Standard, heat-treated
Car signal system	Faraday buzzer
Control	Westinghouse AL
Couplers	Tomlinson, Form 8
Curtain fixtures	Curtain Supply
Destination signs	Wood blocks, P. & W. Ry. Standard
Door-operating mechanism	National Pneumatic
Energy-saving device	Economy watt-hour meter
Gears and pinions	Nuttall
Hand brakes	National
Heater equipment	Consolidated
Headlights	Imperial
Journal bearings	Brass, 4½ x 8 in.
Lightning arresters	Westinghouse type M-F
Motors	Four Westinghouse 535-B, inside hung
Paint and enamel	Murphy
Registers	Ohmer
Seats	Brill Winner, cane
Slack adjuster	Westinghouse
Trolley base	Nuttall
Trucks	Brill
Ventilators	Brill
Wheels	Davis, 30 in.

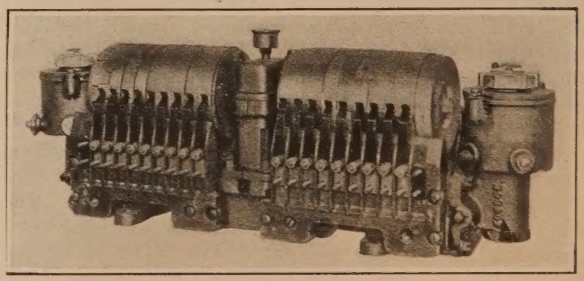
Additional control details required for automatic acceleration are separately mounted in a box on the bulkhead over the door, including the limit relay, sequence drum, and operating relays.

The circuit arrangement for the control embodies the usual Westinghouse type AL control scheme as illustrated in the accompanying diagram. The control is so arranged that this car can be operated in trains with cars equipped with two other types of control used by this company. The master controller has one switching and two running positions. The first position of the controller serves to bring in the LS, R1 and S switches, connecting the pairs of motors in series with the main resistor directly across the trolley. This position is used for coupling and slow operation of cars. The second position of the controller permits the sequence drum to advance to the full series position under control of the limit relay, while the fourth and last position allows the sequence drum to advance to full parallel with short field connection of the motors. The operator may choose at will the position of the master controller, and the sequence drum will advance to the corresponding position. Notch by notch acceleration may also be obtained by oscillating the master controller drum between the first and second positions or the third and fourth positions, each oscillation serving to advance the sequence drum one notch.

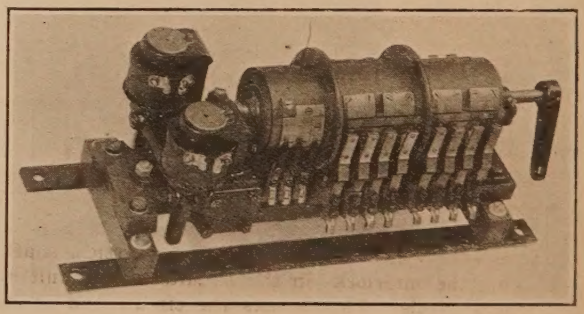
A protective feature has been added through the interlocking scheme in the circuit to the LS switch coil. Loss of power such as is caused by gaps in the third rail or the tripping of the overload trip relay causes the switches to open. Power cannot again be applied to the motors excepting by repeating the regular notching-up process. This circuit contains two interlock contacts. One contact is carried on the sequence drum and closes the circuit to the LS switch coil on the first position only. The second contact is carried on the moving element of the LS switch itself and shunts the first contact when the switch is closed. The contact on the drum closes the circuit to the coil and causes the switch to close, at which time the contact on the switch closes the shunt circuit, and continues to hold the switch closed while the drum advances to succeeding positions. In this manner the LS switch maintains its own operating coil circuit. Should the switch open for any reason, it cannot be closed again until the drum is in its original position. This feature eliminates motor flashing, prevents the tripping of heavily loaded and sensitive substation circuit breakers and maintains smooth, reliable and safe operation.



The Interior Is Divided to Provide a Smoking Compartment



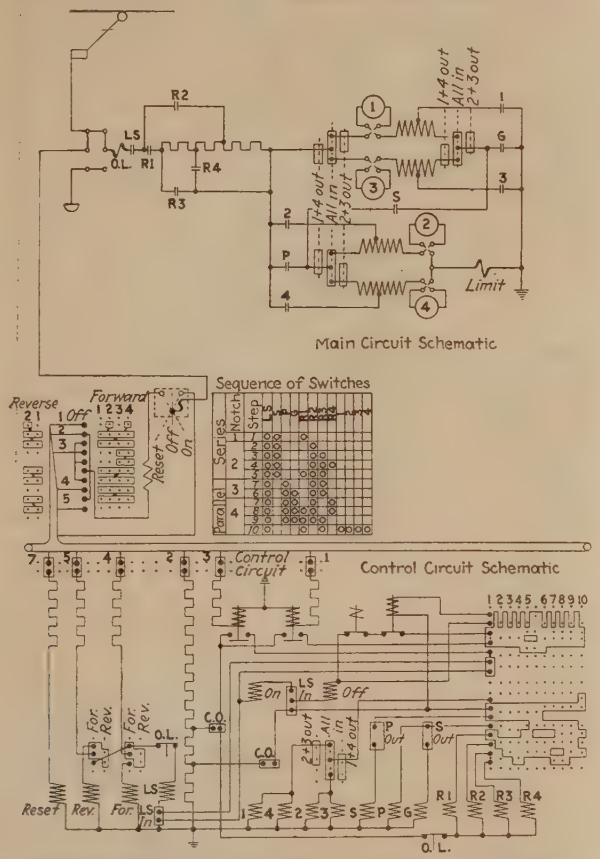
The Sequence Drum Replaces the Older Type of Interlocks to Give Automatic Acceleration of the Motors



The Air-Operated Reverser Is Arranged for Emergency Hand Operation

The main and auxiliary switches are mounted on a common base centrally in the cabinet. These switches are of the single-pole, double-throw, knife-blade type and are used to transfer the respective circuits to either third rail or overhead trolley. Above and to either side of these switches are mounted eight electro-pneumatic unit switches, while below are mounted the control cut-out, overload trip relay, reverser and motor cutout drum. The details are front connected, permitting ready access for inspection and maintenance.

The 10 switches are self-contained units with individual blow-out coils, being identical and interchangeable. Two of the switches are assembled in a sheet steel box



Control Circuits Are Arranged for Automatic Acceleration

and are hung from the car underframe. These two switches are used to take care of short circuits and overloads.

The lower contact of the switch is the moving element and is mounted by means of an insulator directly upon the piston rod. A heavy spring surrounds the piston rod and forces the piston down with a pressure of approximately 100 lb. The normal operating air pressure is 70 lb. per square inch, which gives a gross upward pressure of about 210 lb. so that a net pressure of about 100 lb. is obtained at the switch jaw. The stationary upper contact is shielded within an arc chute held between the pole pieces of the blow-out coils.

Protection from overloads and short circuits is provided by means of an overload trip relay, with a series coil in the main motor circuit. The coil actuates an armature which strikes and lifts a vertical shaft carrying the interlocks in the circuits of the unit switch magnet coils. This breaks the circuit and opens the switches. The relay is returned to normal or reset position by means of a reset coil which trips the armature from the locked position.

The reverser and the motor cutout switch are very similar. The reverser is normally electro-pneumatically operated but may be operated manually, whereas the cutout is manually operated only. Fingers carrying motor current are mounted upon an insulating base and rest upon copper contacts carried upon a drum which is moved by the magnet valve or handle, as the case may be. The circuit to the magnet coils of certain of the unit switches is brought to fingers and contacts on the reverser for interlocking to insure against moving the reverser while power is being applied to the motors. Similar interlocking is accomplished on the cutout to prevent closing the short field unit switches when the corresponding motors are inoperative.

Automatic acceleration of the motors is accomplished by means of a sequence drum, governed by a limit relay. The drum has a definite rate of rotation giving a constant rate of acceleration. It is operated by two opposed magnet valves and cylinders connected by a rack engaging with a pinion carried on the drum shaft. Energizing the "on" magnet opens the inlet valve to its cylinder; energizing the "off" magnet opens the exhaust part of its cylinder. De-energizing causes the reverse operation. Consequently energizing both magnets causes the drum to advance in one direction, whereas de-energizing both magnets causes the drum to rotate in a reverse direction. Energizing one and de-energizing the other stops progress of the drum in either direction.

The limit relay used to govern the rate of advance of the sequence drum comprises a series coil in the main motor circuit whose armature carries a contact in the circuit of the "off" magnet of the sequence drum. When the motor current exceeds a predetermined value, the armature is actuated, lifting the contact and breaking the circuit to the "off" magnet of the sequence drum and thereby arresting further advance of the drum until the motor current drops to the proper value.

The train line circuits carry trolley potential, whereas the control apparatus operates at approximately one-fourth trolley voltage or less. To keep the high voltage out of the control apparatus, operating relays are provided. These are connected to the respective train-line circuits and when energized close the respective low-voltage control circuits. One relay controls the circuit that causes the sequence drum to progress to full series or full parallel, whereas the other relay causes the drum to advance through transition of motor circuit connections. The low-voltage control circuits are energized from the control resistor, which is of the heater type and is mounted under the car.

Altoona Trainmen Have Voluntary Relief Association

THE employees of the Altoona & Logan Valley Electric Railway, Altoona, Pa., have organized a voluntary relief association. The dues are $1 per month. Accident and sick benefits are paid at the rate of $1 per day. In case of the death of an employee his family receives $200. In case of the death of the wife of an employee, the latter receives $100. At the same time all employees are insured under the Metropolitan group insurance plan. The railway pays the premiums to the extent of $500 for each employee, who has the privilege of taking out $500 more on his own account.

Continuous Transit Proposed for Atlanta

Underground Moving Sidewalks in the Business District Are Suggested in Beeler Report as the Most Economical Method of Relieving Sidewalk Congestion—New Viaducts and Double-Deck Streets Are Other Improvements Recommended

UNTIL recently Atlanta had no city plan. The wholesale, packing and manufacturing districts closely adjoin the shopping district, and the heavy teaming, trucking, light vehicular traffic and street cars mingle promiscuously to the detriment of all. The streets are narrow, comprising only 33 per cent of the business area. Many are not through streets, branching off from Peachtree, the main street, first on one side and then the other, herringbone fashion. This arrangement is responsible for a multiplicity of turning movements, resulting in traffic congestion and consequent delay.

To remedy some of the deficiencies a city plan was adopted in 1922. A traffic plan following this scheme, but containing certain additional features made desirable by more recent developments, has been prepared by the Beeler Organization, New York, and presented to the city. A number of features of this report were described in ELECTRIC RAILWAY JOURNAL for Jan. 10. Others are outlined below.

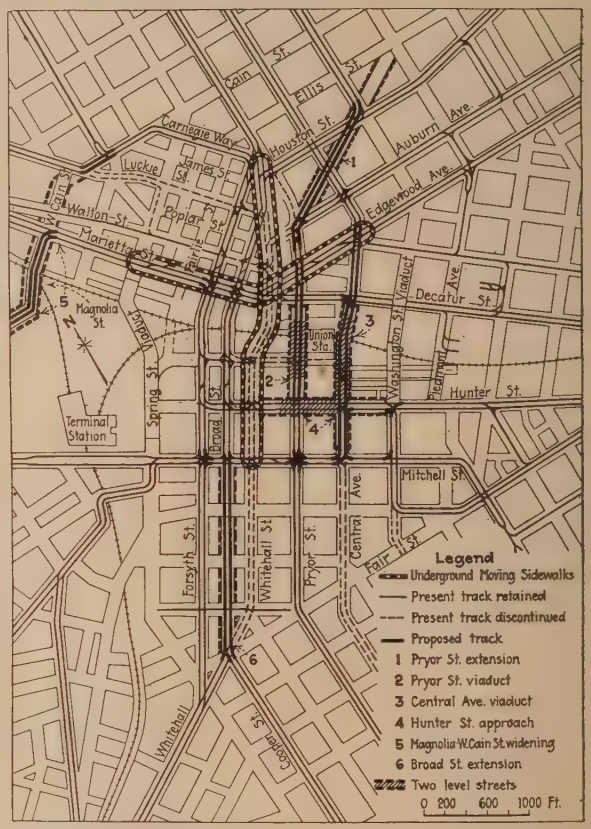
Concentration of traffic in the small area of the central business district has resulted in the slowing down of all vehicular and street car movements. During the evening rush hour automobiles, taxicabs, buses and jitneys choke the main thoroughfares. The cars are slowed down to little better than a walk and pedestrians jostle each other to the limit of the sidewalks and crowd the street intersections. The pedestrian far outranks all the rest both in numbers and importance, according to the Beeler report. A check showed that 14,658 pedestrians passed Five Points, the intersection of Marietta, Decatur, Peachtree Streets and Edgewood Avenue, during the rush hour and there were only 8,785 riders in vehicles of all sorts.

New and enlarged transportation lanes for the vehicles and additional transit facilities for the pedestrians are needed. By rerouting the cars, widening streets, cutting new streets, building viaducts and an underground moving sidewalk, traffic will be diffused and equalized throughout the congested area. A revised plan for the business district as recommended in the report is shown in an accompanying illustration. The seven principal north and south streets will then cross overhead the steam railroad tracks which bisect the business district. Three arteries will be given over solely to vehicular traffic and four others will care for the street railway and general traffic. Double-decked streets are also recommended.

UNDERGROUND MOVING SIDEWALK PROPOSED

It is proposed that a system of continuous subsurface transit be installed. Two sections are recommended, one on Peachtree-Whitehall Streets from Mitchell to Carnegie Way, a distance of 2,960 ft.; the other on Marietta-Edgewood Streets between Spring and Ivy, a distance of 2,300 ft. The total length of the system would be 5,260 ft.

This method of handling local transportation is favored in the report because of the density of pedestrian traffic. It would consist of three parallel continuous platforms directly beneath the surface sidewalk, operating endless chain fashion, up one side of the street and down the other, looping back at the terminals. The speeds proposed for the first, second and third platforms are 2, 4 and 6 m.p.h., respectively. A stationary walk 30 in. wide inside the low speed platform would permit access at any place along the line.



Proposals of the Beeler Report to Relieve Traffic Congestion in the Business District of Atlanta, Including Street Openings and Viaducts, Two Sub-Surface Moving Sidewalks and New Car Tracks

According to the plan the first and second platforms would each be 27 in. wide. The outside platform would be 57 in. wide and would be provided with seats spaced 32 in. from center to center, each accommodating two passengers. The total width of the three platforms assembled would be 9 ft. 3 in. and the height of the platform above the rail would be less than 12 in. The second and third platforms would overlap the adjoining platforms about 1 in.

Each walk would be made up of a series of small trucks about 8 ft. long with radial ends fitting exactly into each other. Each truck would have at one end two independent wheels on ball bearings and at the other end rest on the preceding truck through a universal coupling. Compressed sheet metal covered with anti-slip mastic would be used for the floors.

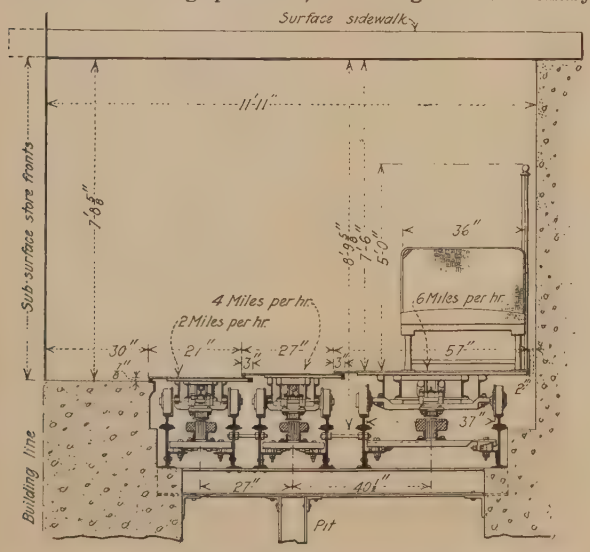
Either of two methods of propulsion may be employed, induction drive or racks and pinions. In the first instance, a secondary element similar to the short-circuited winding of an induction motor, made in straight sections 8 ft. long, would be placed on the under side of the trucks forming the platforms. The stationary or primary elements of the motor would be in sections 5 ft. long and placed between the rails in groups about 140 ft. apart with an air gap of ⅜ in. between the primary and secondary. Both elements would be adjustable so as to preserve the air gap. Three-phase alternating current with a frequency of 37.5 cycles per second would be used to drive the high-speed platform. The 2-mile and 4-mile platforms would be driven in this manner with the identical construction, but with the frequency reduced to 12.5 and 25 cycles, respectively. (This system was described in ELECTRIC RAILWAY JOURNAL for Nov. 24, 1923, page 899.—ED.)

With the rack-and-pinion method, the racks would be continuous and mounted on the under sides of the platforms in the same manner as the secondary element in the induction drive. The driving units would be placed at intervals of from 1,000 to 1,500 ft. The induction drive method is thought to be the more simple, satisfactory and efficient.

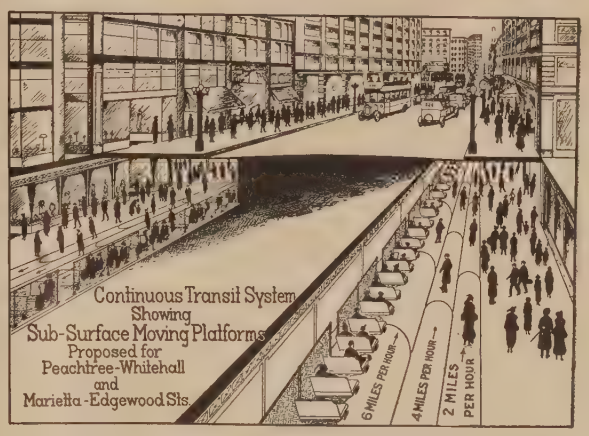
In operation, the passenger boarding the moving platform would step from the stationary walk or station to the first platform, which would travel at 2 m.p.h.; then to the second, traveling at 4 m.p.h., and finally to the third, traveling at 6 m.p.h. Here he would take a seat and be transported nearly twice as fast as he could walk. In alighting, the reverse order of stepping from one platform to the next would be followed.

In the event that a higher rate of speed is later found advisable this could be increased to 2.5, 5 and 7.5 m.p.h., or even 3, 6 and 9 m.p.h. Considering the comparatively short distances involved in the Atlanta plan, speeds of 2, 4 and 6 m.p.h. are thought to be satisfactory. Every fourth unit, comprising three double seats, might be especially designated for the use of the colored population. These seats might be enameled a brilliant blue, while the other seats are buff or orange, so that the two classes could be distinguished readily.

Such a moving platform, including the stationary



Cross-Section of the Moving Sidewalk Recommended as a Means of Relieving Sidewalk Congestion



The Appearance of the Proposed Continuous Transit System

walk, requires a clear space 12 ft. wide and 9 ft. high, including the rails. Entrance stairways would be constructed on both sides of every street intersection and basement entrances from important stores and buildings at intermediate points. With the stationary walk, a continuous station would be provided the entire length of the line, permitting the stores to improve their basements and make a continuous arcade. The general arrangement proposed and a cross-section are shown in accompanying drawings.

In case of an interruption in the service from any cause, the speed of the platforms can be controlled automatically. Should a platform be disabled from any cause it can be stopped and the other platforms continued in operation at a reduced speed. In the event that all movement is stopped, there will always be a continuous open walk 9 ft. wide, well lighted, well ventilated and with exits to the street above every 200 to 300 ft.

The installation requires an excavation but slightly in excess of 250 sq.ft. in cross-section, as compared with 1,000 sq.ft. in four-track subway construction, and the cost will be proportionately less, as the interference with sub-surface structures is minimized.

The total weight of the rolling stock equipment per seated passenger is 350 lb. as compared with 1,500 lb. in subway operation, and the total tractive resistance per ton is less than one-half of that in the latter operation. The seated capacity at the 2, 4 and 6 m.p.h. rate would be 23,600 passengers per hour each way, the report states.

The first cost of equipment complete, including tunnels, is estimated to be about one-fifth of the cost of a four-track subway equipped, and the operating cost is about one-sixth as much for equivalent service.

Advantages claimed for this system of continuous transit are that it will afford relief to the present street traffic congestion, will more than double the present sidewalk area of the streets affected, will transport pedestrians 100 per cent faster, without exertion, and will distribute passengers from the various transportation arteries to practically all parts of the business district. It will afford the merchants and stores along its route double display space with show windows on both the street above and the moving walk below.

MOVING WALK WOULD AVOID PARKING

Parking of cars can be virtually eliminated from the streets of the entire central district. In fact, it will be unnecessary to enter the more congested parts of the business district with the automobile, the report says,

because the owners may park their cars outside of the business district, step to the nearest entrance of the moving platform and be quickly transported to within easy reach of any part of the central district. Garages of huge proportions could be located near the platform terminals on the north, south, east and west sides, where cars can be parked and otherwise cared for at a nominal expense. It is recommended that this system be built by the municipality and the service furnished free to the public. The estimated cost of the installation is $3,000,000.

Development of Close-In Territory

Many beautiful suburbs have been developed in the territory contiguous to Atlanta. In fact, the growth has been faster outside of the city than within. This development is a large factor in Atlanta's prosperity, but, being scattered, is rather costly to the community as a whole. With communities moving out from the business center the expense of supplying them with modern conveniences increases. Longer electric light and telephone lines, more gas mains and more street car tracks are needed with a scattered than with a compact community. This is reflected in the increased operating expenses, which must be paid for by the public with the service charges. The effect of this can be seen from the average distance the railway carries its pay passengers, 3.40 miles, which is unusually long for a city of this size.

According to the report, however, there is close-in territory practically undeveloped. Some would require extensive grading, while other sections could be developed at very little expense. It is urged that the city institute a campaign for the development of close-in territory. This development can be encouraged by the improvements recommended.

To remedy present conditions and properly care for future expansion, a number of important civic improvements, including street openings, viaducts and other improvements, are necessary. The steam railroads between Decatur and Hunter Streets bisect the business district, as shown on the accompanying map. Of the seven principal thoroughfares connecting the two parts, the two outer ones, Spring and Washington Streets, are carried over the railroads on viaducts. Forsyth, Broad and Peachtree Streets cross overhead on bridges, while Pryor Street and Central Avenue cross the tracks at the surface. During the rush hours the Peachtree, Broad and Forsyth Streets bridges are so badly congested that the overflow is forced to use the grade crossings. More than 500 vehicles per hour cross these busy tracks at either end of the Union Station during the period of maximum traffic.

Two viaducts are recommended, as follows: On Pryor Street, commencing at Decatur Street and extending to Hunter Street, and on Central Avenue, commencing at Decatur Street and extending to Mitchell Street. By extending the latter to Mitchell Street, ample headroom will be provided for all the roadways of the Atlanta joint freight terminal. The heavy hauling to and from these terminals and the produce house district on Alabama Street will be conducted on the street level, where it will not interfere with the faster movements of the lighter traffic overhead.

Street Openings and Widenings

One of the most detrimental features of the layout of the business district is that the principal thoroughfares end blindly or converge. At the present time the city has arranged for, or is considering, several needed street improvements, notably the widening of Peters Street and the opening of Madison Street into Whitehall. A number of other projects, however, are recommended in the report. Broad Street should be opened from Mitchell through to Cooper and Whitehall and Pryor Street should be extended from the intersection of Auburn, swinging to the east, and giving a connection with Ivy Street, Courtland Street and Piedmont Avenue. Magnolia and Cain Streets should be widened between Davis and Luckie Streets.

The cost of street opening and widening projects considered in the report is estimated at about $2,500,000. Construction of viaducts will necessitate an additional expenditure of approximately $2,000,000. The expense of street widening and opening should be divided into two equal parts, the report recommends, one part to be assessed against the property benefited and the other to be paid for by the city at large. The cost of building viaducts should be divided into four parts, the steam railroads, the street railway, the property benefited and the city at large paying equally.

The recommended street openings and new viaducts will enable the Georgia Railway & Power Company greatly to improve the car routes in the downtown district. Among the important changes of this kind recommended in the report are the discontinuance of track on Peachtree and Whitehall Streets between Cooper Street and Luckie Street and the construction of new track on the extension of Broad Street between Mitchell Street and Whitehall Street. Details of the proposed changes in car routes will be given in an article which will appear in a future issue of this paper.

More Evidence of the Merchandising Value of New Equipment

WITH the close of 1924, the Indianapolis & Cincinnati Traction Company completed 6 months operation with its new rolling stock, the system having been changed from a.c. to d.c. operation and the new cars placed in service on July 1. In the month of June just prior to the change, this company showed a 15 per cent loss in number of passengers as compared with June, 1923. Similarly, for that month and for the 6 months to the end of the year, the other interurban companies using the Indianapolis terminal, exclusive of the Interstate Public Service Company, which also operates new cars, have had a traffic running from 15 to 21 per cent less than for the corresponding months of 1923. But the new cars on the Indianapolis & Cincinnati lines attracted patrons to the extent that for July, August, October, November and December the number of passengers was just about even with, slightly above or below, the number for the corresponding months of 1923, and for September was 6 per cent above.

An interesting sidelight on the number of passengers in September was that during the State Fair held in this month the I. & C. offered a round-trip ride for 80 per cent of the one-way fare and took in more money than the year before with the old equipment and a round-trip fare of 1½ times the one-way fare.

As a further effort to advertise the new equipment, a $1 round-trip fare to and from any point on the line has been in effect for 24 Sundays. Without exception the revenue taken in on each Sunday has been more than was taken in on the corresponding day for the year before.

Trolley Arrangement on Bascule Bridge

Bar Construction Is Replaced with Trolley Wire on Lift Bridge of the Galveston-Houston Electric Railway—Hinged Connections and Flexible Suspension Among Improvements

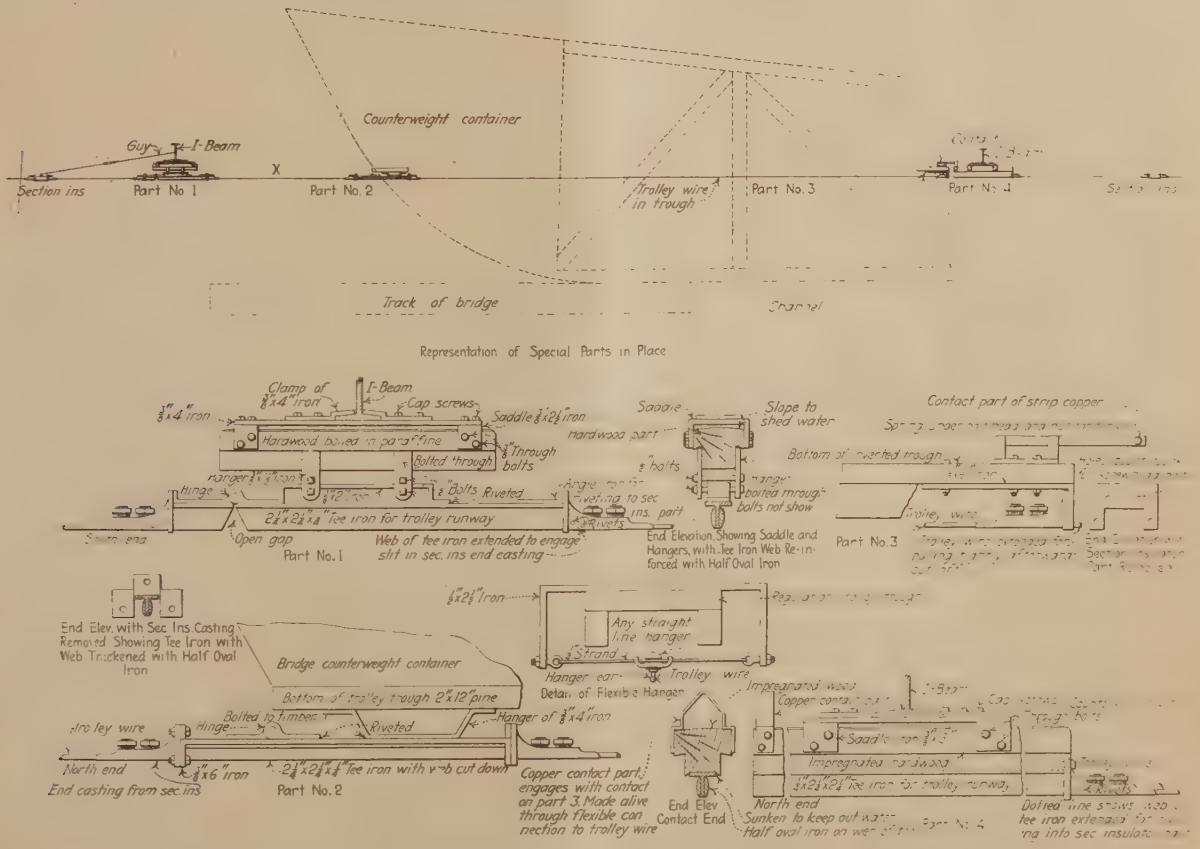
By C. L. Greer
Galveston-Houston Electric Railway, Houston, Tex.

THE problem of providing a satisfactory trolley wire arrangement on a bascule bridge of the Galveston-Houston Electric Railway has been a perplexing one for 12 years. A satisfactory arrangement has now been obtained, and is shown in the accompanying illustration.

Before the present construction was adopted, the trolley runway over this bridge consisted of two steel angles placed together so as to form a "T," and fastened to the under side of a trolley trough. The section which slacks back as the bridge is lifted was formed of a flexible wire rope, which had a system of weights and pulleys to take up the slack as the bridge raised. This arrangement was unsatisfactory, as the wire rope wore out rapidly and serious difficulty was experienced from the trolley wheels leaving the runway.

The construction illustrated has now been substituted. Considering the parts as they appear from left to right in the accompanying illustration, the first is a section insulator, which separates the trolley runway on the bridge from the line to the left, so that the section of trolley on the bridge is fed from the right end. This section insulator is connected to Part 1 by standard No. 0000 grooved trolley wire. The end castings of Part 1 are made from standard section insulators. The center part is made to form a hinge and is supported from one of the I-beams of the bridge by a saddle fastened to a hardwood insulator. The top of this wooden section is sloped so as to shed water readily, and the lower part is formed to take two hangers from which a $\frac{3}{8}$-in. x 2-in. iron is supported. This in turn supports a $2\frac{1}{4}$-in. x $2\frac{1}{4}$-in. x $\frac{1}{4}$-in. T-iron, used as the trolley runway. The sides of this iron are reinforced with $\frac{1}{2}$-in. oval iron. The part between 1 and 2 slacks back as the bridge is lifted, and in the latest construction consists of No. 0000 grooved trolley wire, the same as the remainder of the line. In the first construction used, $\frac{3}{8}$-in. galvanized messenger wire was tried. As it is sometimes necessary for cars to stop and start on the bridge, heavy currents are drawn, and the galvanized wire proved unsatisfactory. The hinged arrangement of Part 1 allows this section of the trolley to drop as the bridge is lifted.

At the left-hand end of the bridge counterweight container another hinge construction is used. This is shown as Part 2 and is quite similar to that of Part 1. The end castings used are from standard section insulators. Parts 3 and 4 are arranged to break the contact as the bridge lifts. No. 3 supports the end of the trolley wire and has a contact piece of strip copper at the top. Part 4 has contact jaws to form the other part of the switch, which breaks as the bridge opens. The section insulator shown at the right has a jumper around it, with a disconnecting switch. The bridge trolley wire is fed through this jumper.



Construction Used for Trolley Wire on Bascule Bridge of the Galveston-Houston Electric Railway

Slacking back of the line trolley is prevented by guys which run from the section insulator at the left-hand end of the bridge to the I-beam, to which Part 1 is clamped. When the bridge is down, the guys are slightly slack, and the section between Parts 1 and 2 takes the full trolley strain, but as the bridge rises, the guys are pulled taut so as to take the entire trolley strain.

The section insulator at the left end also has a jumper with a switch, which is normally kept open and is used only in case it is necessary to energize the trolley wire on the bridge from the left end.

A detailed sketch is also given of the special hanger for the trolley wire used along the trough. This type of hanger is very flexible and much better than the stiff barn hanger commonly used in such locations. It also eliminates the hammer blow which usually takes place with this type of construction.

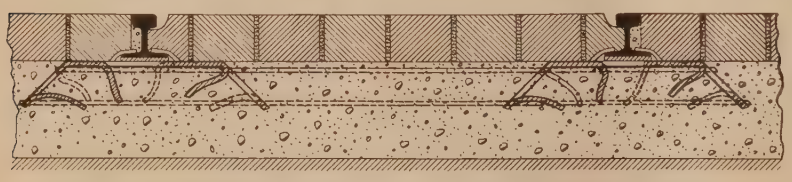
Cushion Tires Tried at Cleveland

Experiments Are Being Made with a Track Structure Which Provides Unusually Wide Support for the Rails—An Asbestos-Asphalt Cushion Is Expected to Have an Important Effect in the Elimination of Noise

A NEW type of substitute tie designed by Charles H. Clark, engineer maintenance of way Cleveland Railway, and Chester F. Gailor, consulting engineer, is being tried in Cleveland. This differs from the ordinary type in that it has a greater width of support for the rail. Contrary to usual practice the rail supports are not continuous from one rail to the other, but are provided for each rail individually and connected only by tie rods.

Each of the supports is made from flat sheet steel formed into a trapezoidal channel or chamber open at the bottom. At suitable points tongues of metal are punched out and bent inward to project into the chamber. Other portions in the form of lugs or clips are punched out and bent outward or upward extending lengthwise of the track and being arranged to project over the two edges of the rail base. There are four of these to each support.

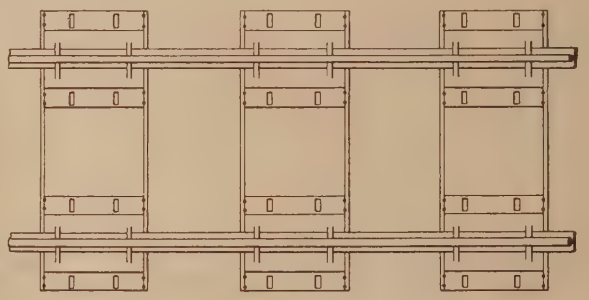
The chamber is then filled with concrete, which is done in the yard of the track department or at any other suitable place before the supports are taken to the job. The pouring is done while the support is in an inverted position held by a suitable frame. This frame has end walls to close the open ends of the chamber and thus hold the concrete. The tongues or inward projections form steel reinforcing members. It is thought that pouring the concrete with the side walls of the chamber converging downward will insure that the mass of concrete will be homogeneous and that a good connection between the concrete and the metal will be obtained.



Type of Track Construction Being Tried in Cleveland with Asbestos-Asphalt Cushions Under the Rails

Rail holding clips take the place of spikes or similar rail fastenings. To fasten the rails after they have been placed on these metal supports the clips are hammered down until they are in firm contact with the rail base. As this sometimes proves difficult in practice, small wedges are driven between the upper surface of the rail base and the lower surface of the clips. These are then welded to the rail.

The rail base rests on an interposed flat strip of asbestos-asphalt or other suitable material, which forms a cushion of the same width as the rail base and as long as the top member. In this way a damping effect is obtained which it is thought will eliminate most of the noise now common to street railway track structures in paved streets.



The Unusual Spread of the Rail Supports Gives This Track Greater Stability than Is the Case with Ordinary Ties

In order to maintain the proper gage, tie rods have been welded at top and bottom of the supports. These rods are then imbedded in the concrete base in which the rail supports are placed, thus forming a continuous solid mass. This also acts as reinforcement for the concrete. The upper surface of the base concrete is made flush with or slightly above the upper surfaces of the steel supports.

A cross section of the track structure is shown in an accompanying illustration. The paving blocks are grouted at the joints and the heads and webs of the rail are likewise imbedded in grout. In this way a monolithic structure is obtained. Notwithstanding the rigidity of the mass, the track is said to be practically noiseless on account of the cushions under the rail. This design provides considerably greater support for the rails than is now ordinarily furnished, the ties covering about half of the linear dimension, while the central portion of the tie, which is of no great value in monolithic construction, is eliminated.

The work of placing supports of this type can be done with the simplest track tools. The supports are comparatively light and therefore easily handled, the expense of handling and shipping them being correspondingly low. As the support is made in one piece with the rail fastening it is impossible for the parts to work loose or become unserviceable on account of rusting of the threads as sometimes happens when screws and nuts are used. It is claimed that owing to the greater area of support it is possible to use a lighter rail section without impairing the stability or the lasting qualities of the track and roadbed. Should it be desired to do so, this type of rail support can be made continuous from one rail to the other, instead of being made in two pieces connected by tie rods.

Oldest London Tube Reopened

After Extensive Changes Taking Two Years, Including Enlargement of the Tunnel and Modernization of the Stations and Rolling Stock, the City Railway Has Inaugurated Through Service with Other London Underground Lines

Exterior of the Stockwell Station on the City & South London Railway. This Is One of the Reconstructed Stations

THE City & South London Railway of London, England, which has been closed in parts for about 2 years during the work of enlarging its tubular tunnels, was reopened for traffic on Dec. 1, 1924, throughout its entire length of more than 7 miles. At the same time joint services were established with the Charing Cross & Hampstead Railway via the new junction between the two lines at Chalk Farm, through trains being run from the City & South London line to Highgate on one branch and to Hampstead and Edgware on the other.

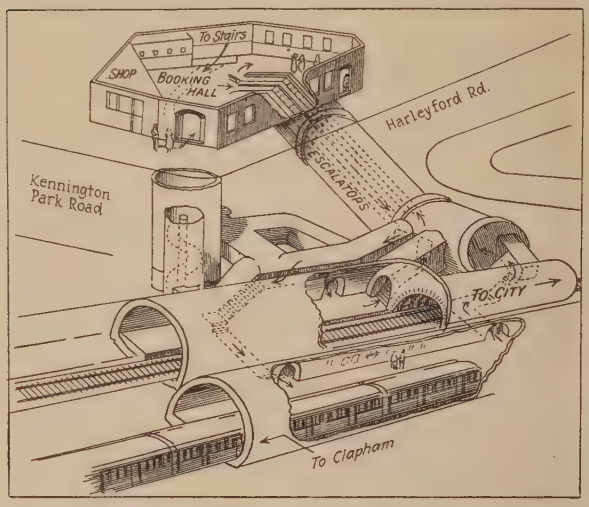
The original section of the City & South London Railway, some 3 miles long, from King William Street in the City of London to Stockwell in South London, was the first underground electric railway in the world. It was opened for public service in December, 1890. Various extensions were made from time to time, both to the south and to the north, until the railway extended from Clapham to Euston, giving interchange stations with the main-line termini from the north. A further extension, some 5 miles long, from Clapham to Morden in Surrey, is now under construction.

Down to the time of the reconstruction now completed the tunnels were of only from 10 ft. to 10 ft. 6 in. diameter, with an 11-ft. 6-in. bore for a short distance. The cars accordingly were far from roomy, and they were hauled by small electric locomotives. Power was furnished by 500-volt, direct-current dynamos, and a third rail conductor was used. As the railway was extended, the three-wire system, and ultimately a five-wire system giving a pressure of 2,000 volts between the outers, was adopted for transmission to the most distant parts of the line. This involved the use of substations for stepping down the pressure.

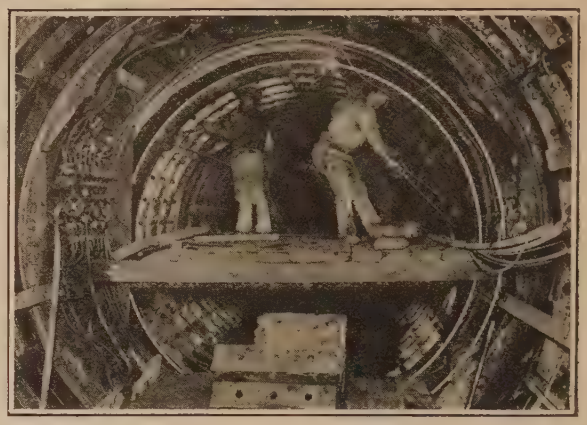
Booking Hall and Escalator Exit on Street Level at Stockwell Station

In 1912 the railway was brought into the combine formed by the Underground Electric Railways Company of London, Ltd. This led to the abolition of the independent City & South London Railway power station at Stockwell, as thenceforward substations of the City & South London Railway were fed by the 11,000-volt, three-phase current from the larger power station built by the Underground company at Chelsea to supply all the associated electric railways in the group.

The management of the various railways then entered on a scheme for extending them in various directions and for linking them together. No through



The Reconstructed Stockwell Station, Showing the Lifts Replaced with Escalators



The Tunnel During the Work of Enlargement. The Cast-Iron Segments Were Removed and the Tunneling Carried Out with the Greathead Shield System

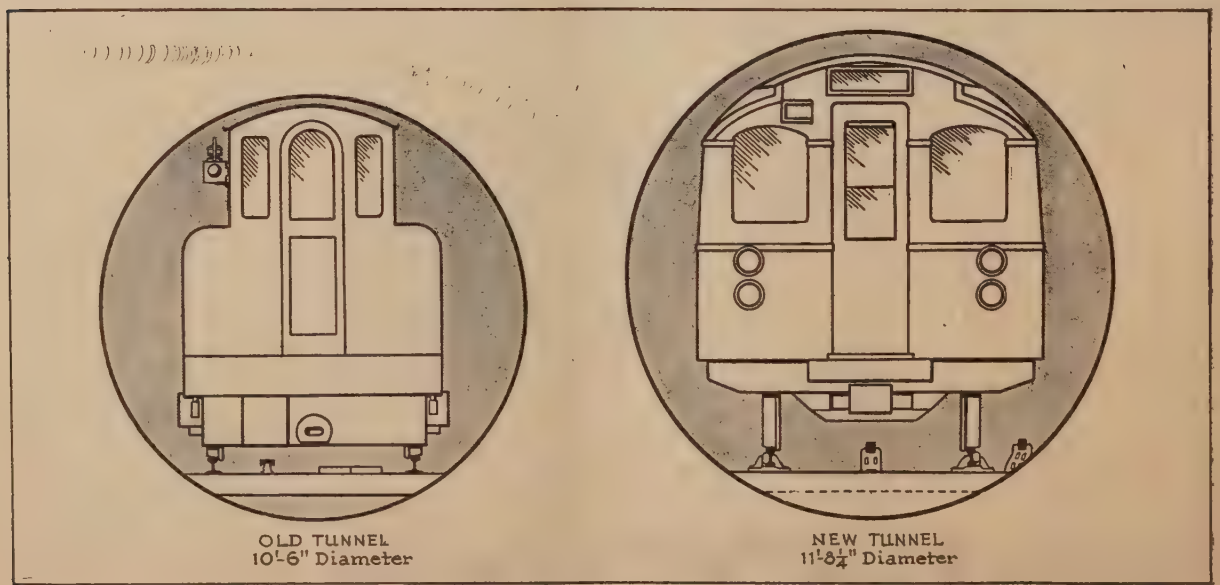
running, however, could be carried out in the case of the City & South London, as its tunnels were too small to admit of the standard size rolling stock used on the other tube railways. It was decided to enlarge the diameter of the City & South London tunnels to the size of 11 ft. 8¼ in. standard on the London Underground lines, and to make a junction with the Charing Cross & Hampstead Railway at Chalk Farm. This is the work which, after 2 years of construction, has now been completed. The electric locomotives have been abolished, the small old cars done away with, and new multiple-unit rolling stock similar to that on the other tube railways, which was described in this paper (issue of Sept. 20, 1924) substituted. The whole construction and equipment, including the passenger stations, have been modernized.

To enlarge the tunnels, the whole of the cast-iron lining segments were removed ring by ring, and as the tunnel was reamed out by the Greathead boring shield the lining was built up again, partly with new segments. On curves the tunnels have been enlarged to from 12 ft. to 15 ft. in diameter. The curves have been smoothed out and the general running conditions improved. The work was one of great difficulty, as during part of the period of reconstruction train services were continued in the daytime. Owing to the infiltration of water, work on some sections had to be carried on under compressed air.

Improvements have been carried out on many of the passenger stations, some of which have now their booking halls under the street level. Escalators in many cases supersede lifts, and everything has been brightened up. New track and new conductor rails have been installed, the running rails consisting of London standard 85-lb. per yard bull-headed section, laid on chairs bolted to wood sleepers. The positive and negative conductor rails are of special high-conductivity steel. The latest system of automatic signaling has been installed.

Train schedules have been speeded up and fares reduced, while through season ticket arrangements have been made with connecting railways and buses.

It was stated by Lord Ashfield, chairman of the Lon-



Sections of the Old and New Tunnels. The Original Tunnel Had a Diameter of 10 Ft. 6 In., While the Reconstructed Tunnel Has a Diameter of 11 Ft. 3¾ In.

The City Railway Is Shown on the Map in Its Relation to the Other Portions of the London Underground System

don electric railway companies, at the opening ceremony on Dec. 1, that when extensions are completed the City & South London Railway will have the longest railway tunnel in the world, namely, 14 miles. He also mentioned that the various underground railway extensions with which his companies are associated will cost £16,000,000.

The spaciousness of the new cars and their easy and comparatively noiseless riding qualities were commented on at the opening run. It is proposed to call the reconstructed line "The City Railway."

On the opening day, beginning at 12:30 p.m., the passengers carried totaled 95,000, including 15,000 who were provided with free tickets. The bulk of these free tickets were not presented until after 7 p.m. Their holders were then accompanied by their wives and families, all riding the entire length of the line and back. No fewer than 500 passengers purchased season tickets at Clapham Common or took away forms for that purpose.

On the second morning the travel was unprecedented. Dense traffic presented itself at Clapham Common, Stockwell and Elephant Stations. At 5:30 a queue of more than 200 passengers lined up at Clapham Common booking office. Additional booking clerks were at once rushed to the station, but even then the queues showed no signs of abating. Ultimately, a number of ticket collectors provided with tickets from the booking office paraded along the queues and did a roaring business. This stream of passengers two and three deep was maintained until after 9:30 a.m.

Zone Check System Used on P.-O. One-Man Interurban Lines

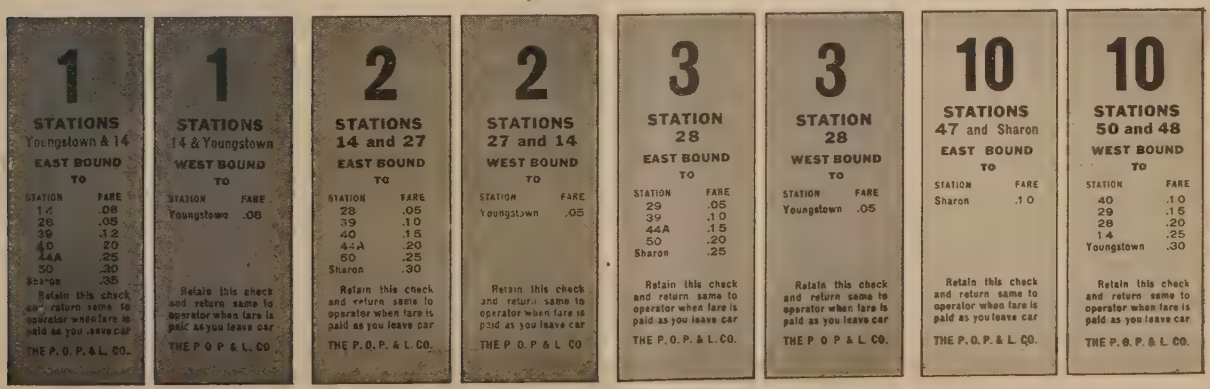
BY H. H. BEST
Traffic Engineer Pennsylvania-Ohio Electric Company

ONE of the biggest problems in one-man interurban operation is to provide a convenient, speedy, practical, inexpensive and workable system of fare collection. The tariff rates on the interurban lines of the Pennsylvania-Ohio system are arranged by zones. It was logical, therefore, to inaugurate a zone-check system for the identification of passengers. On the line between Youngstown, Ohio, and Sharon, Pa., there are 10 zones, the through fare being 35 cents. The interurban line between Youngstown, Ohio, and New Castle, Pa., consists of nine zones, the through fare being 45 cents.

Ohmer registers are used for "pay-as-you-leave" collection of fares. Each zone has a differently colored check. These are carried in a convenient container mounted on a pedestal at the rear of the register. The checks are of thin cardboard 1¼ in. x 3⅝ in. in size. Each check carries the number of the zone in which it was issued, the names of the stations in that zone and the exact rates to all other points on the line. One side of the check covers eastbound traffic and the opposite side covers westbound traffic.

A check is issued as the passenger boards the car except in the initial zone. Passengers who do not have checks as they leave the car are required to pay the maximum fare. The non-issuing of checks to passengers in the initial zone has the advantage that passengers who board elsewhere and who are entitled to them will be sure to get zone checks when they board and to return them to the operator when they leave.

Commutation tickets, school tickets, reduced-rate



These Zone Checks Tell the Passenger the Exact Fare to Any Point on the Line. One Side Is Used for Each Direction

strip tickets, reduced-rate round-trip tickets, full-rate cash tickets, free transfers, paid transfers, trip passes, card passes and weekly passes all are used. The flexibility of the zone-check system permits the collection of fares in this multiplicity of ways. On the Youngstown-Sharon line through service is operated on a 30-minute headway. These through cars, on which the zone-check system is used, carry an average of 135,000 passengers a month or approximately 4,500 daily. The zone-check system has been in service for more than 6 months on the Sharon line. It has proved so successful that a similar system has been installed on the Youngstown-New Castle line and on the Youngstown-Warren line.

A desirable feature in connection with the use of these checks is an improvement in public relations which can be attributed directly to the system. The use of the checks has facilitated the loading of cars at all points on the line. It has eliminated the necessity of a passenger asking questions of the operator regarding the fare, as the check tells just what fare to pay and when to pay it. It has reduced to a minimum the necessity of the operator making change for passengers, as generally the passenger will present the exact change if he knows how much the fare is. From the standpoint of the company, the operators who handle the work, and the traveling public who use the service, the zone-check system has been a marked success.

Telephone Dispatching Saves Time of Work Cars

THE track maintenance department of the Boston Elevated Railway believes that its labor-saving machinery should be kept in service as much as possible. In order to accomplish this a telephone dispatching system for work cars and trucks has recently been adopted. Brief mention of this system was made in an article describing the use of track machinery in Boston published in ELECTRIC RAILWAY JOURNAL for March 17, 1923, page 458. Since that time, however, the system has been modified and extended.

Each foreman on a track construction job telephones the dispatcher's office about 3 o'clock in the afternoon and tells him the quantity of material which will be needed for that job the next day. The hour at which it is needed is also specified. If the quantity is small, delivery is made by motor truck. If the quantity is as much as, or more than, a carload, delivery is made by one of the company's work cars. After having heard from the various foremen, the dispatcher works out his program for using his cars and trucks the next day on work needed.

Trucks are ordinarily employed in the removal of waste incident to track reconstruction. This work can be done by motor truck without blocking the rail, whereas the use of an electric car might somewhat delay the regular passenger service.

Men are borrowed from the transportation department to operate the work cars. Only as many are asked for as will actually be needed. When slow loading material is being handled, trainmen are transferred from one car to another, rather than allowed to remain idle during the time the car is being loaded. Details of this kind are carefully worked out the day before in the dispatcher's office.

No special forms are used by the work car dispatcher. He simply notes the material required by the foremen and the hour at which they require it when they telephone to him. He then prepares the schedule for as many cars and trucks as he expects to need the next day.

Railway Equipment Used to Remove Snow by City

THE people of Toronto, Canada, are quite accustomed to snowstorms, but one of unusual severity required special effort in order to relieve traffic conditions. The Toronto Transportation Commission, which operates the street railway, cleared its tracks of snow quickly and with little interference to service. But as other parts of the streets were not cleaned, the car tracks were used for all traffic, which caused considerable congestion and affected general business conditions. Prompt action by the city department was necessary, and so arrangements were made with the Toronto Transportation Commission for the use of its tracks and equipment in cleaning snow from the sides of the streets.

In order that the passenger car schedule should not be interfered with nor the street car tracks be blocked

Dumping Snow at Manhole for Disposal After Removing It from the Streets of Toronto

for vehicular traffic, the work was done between 12 o'clock midnight and 6 in the morning. Ten Differential dump cars, of the regular equipment of the maintenance-of-way department, supplemented by four flat cars, were used.

The snow was loaded into these service cars from the street by hand and taken to the nearest available manhole and dumped in. Accurate cost was kept by the city and comparison was made of this method of removal with previous methods where trucks and teams were used. The cost of loading and disposing of the snow by means of the dump cars was 17 cents per cubic yard, including rental of the car, based on the regular rental price established by the Toronto Transportation Commission; all labor in loading, and the labor in shoveling that part of the snow which did not fall into the manhole as the cars were dumped. The Differential dump cars are 40 ft. 6 in. long and are propelled by four motors.

The cars carry a load of about 25 cu.yd. per car. The cost of labor for loading and unloading the flat cars was apprximately 5 cents per cubic yard more than with the Differential dump cars.

Graphs of European Tramway Statistics

THE accompanying graphs are from a report on "Fares in Northern and Central Europe," read at the Homburg meeting of the Internationaler Strassenbahn Verein last September by August Winter of the Vienna Municipal Tramway. An abstract of this report was published in the ELECTRIC RAILWAY JOURNAL for Nov. 29. In these charts, the author gives the relations between the lengths of tramway lines, passengers carried, and populations of the districts served for some 47 systems in northern and central Europe from which statistics were collected. These statistics were divided into four groups as follows: (1) systems in German cities; (2) systems in Norway, Sweden, Denmark and Holland; (3) systems in Switzerland; (4) systems in the various countries formerly forming the Austro-Hungarian monarchy.

Chart Fig. 1 shows the relation between the length of route, measured in kilometers (or miles) of single track, and the number of inhabitants in the city served.

The second (Fig. 2) shows the relation between car-kilometers (or car-miles) run and length of line. This the author calls service load and it might be considered an index of service. As will be seen, the line rises rapidly with the size of city served.

The third (Fig. 3) shows the relation between car-kilometers (or car-miles) per unit length of track and population of the city served. This the author calls service density, and plots two lines to indicate the averages in each of two groups; i.e., German and all other roads. It will be noticed in both lines that the ratio of car-miles to miles of route increases with the size of city served, but in varying degree.

The fourth (Fig. 4) shows the number of passengers carried in cities of different size, and the chart Fig. 5 shows annual rides per inhabitant in cities of different size. This index is usually known as the riding habit. In both of these charts, as will be noticed, the curves take the general form that might be expected in American cities, though the lower riding per inhabitant in the German cities as compared with the other groups is very marked. Of the groups outside of Germany, the Swiss roads seem to show the greatest riding per inhabitant. Some of this additional riding may come from the greater number of tourists in the Swiss cities.

The charts as presented originally showed metric dimensions only. English equivalents have been added.

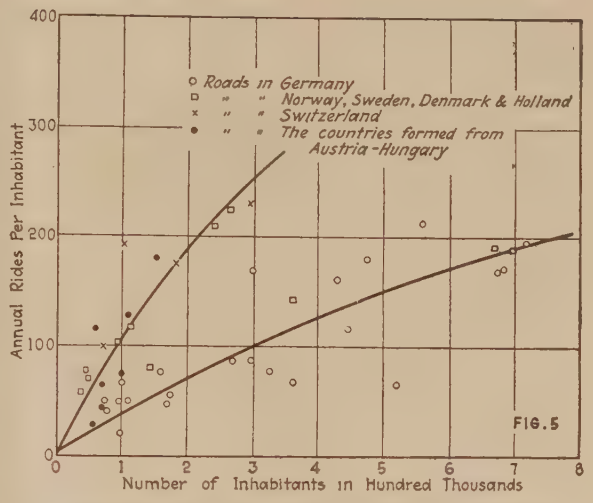
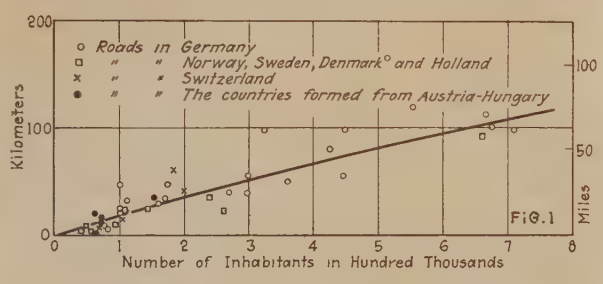
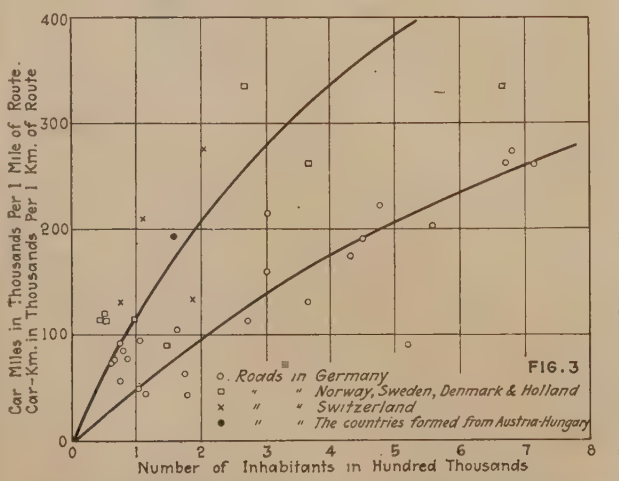
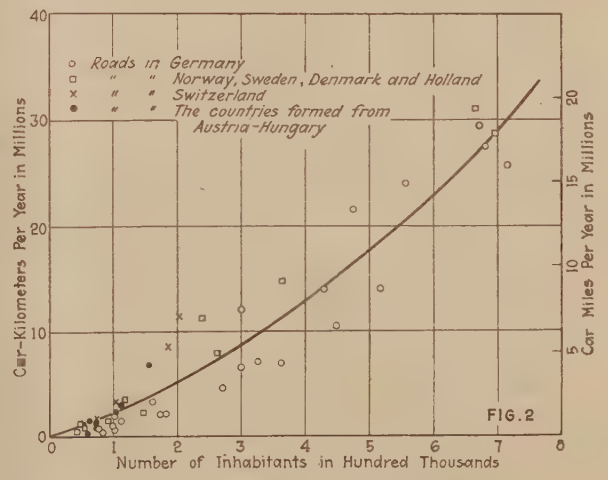
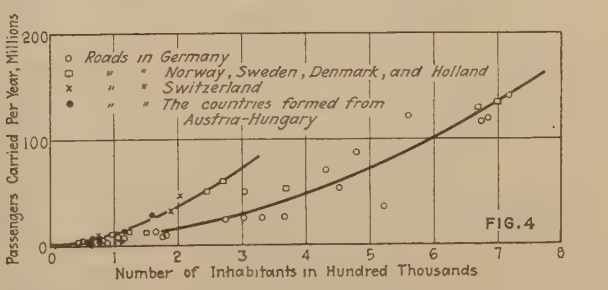

Roads in Germany
" " Norway, Sweden, Denmark & Holland
" " Switzerland
" " The countries formed from Austria-Hungary
Annual Rides Per Inhabitant
Number of Inhabitants in Hundred Thousands
FIG.5

Fig. 5—European Tramway Statistics: Rides per Inhabitant in Cities of Different Size




Car Miles in Thousands Per 1 Mile of Route.
Car-Km. in Thousands Per 1 Km. of Route
Roads in Germany
" " Norway, Sweden, Denmark & Holland
" " Switzerland
" " The countries formed from Austria-Hungary
Number of Inhabitants in Hundred Thousands
FIG.3


Roads in Germany
" " Norway, Sweden, Denmark and Holland
" " Switzerland
" " The countries formed from Austria-Hungary
Car-Kilometers Per Year in Millions
Car Miles Per Year in Millions
Number of Inhabitants in Hundred Thousands
FIG.2


Roads in Germany
" " Norway, Sweden, Denmark, and Holland
" " Switzerland
" " The countries formed from Austria-Hungary
Passengers Carried Per Year, Millions
Number of Inhabitants in Hundred Thousands
FIG.4

Statistics of Railway Service According to Population from Tramways in Northern and Central Europe

Fig. 1—Route lengths in cities of different size.
Fig. 2—Tramway service given per inhabitant in cities of different size.
Fig. 3—Service per unit length of route in cities of different size.
Fig. 4—Passengers carried in cities of different size.

Association News & Discussions

New Yorkers Discuss Interurban Service

Light-Weight Cars, Motor Trucks, Freight Traffic and Fare Collection Are Taken Up at the Midwinter Meeting of New York Electric Railway Association—Developments in Gas-Electric Buses, High-Voltage Insulators and Discipline Also Topics

NEW types of passenger cars and methods of operation in interurban service were the features of the midwinter meeting of the New York Electric Railway Association, held at the Hotel Commodore, New York City, on Jan. 22. The opinion generally expressed was that light-weight one-man cars have proved satisfactory and have not only reduced costs but have given better service to the public than the older types of heavy cars.

The morning session was opened with a paper on modern fare collection methods by W. P. Butler, president Johnson Fare Box Company, New York. N. Y. He described the mechanism of the new type "J" automatic coin switch fare box manufactured by his company which was developed with and first applied on the cars of the Brooklyn City Railroad. Speaking of the experience on that property Mr. Butler went on to say:

"There were 220 of these machines installed on the cars of the Brooklyn City Railway more than a year ago, and the result of their operation has been most gratifying to the management as well as ourselves. These machines were not hastily built nor were they perfected without making mechanical changes to meet the full operating requirements. This work required constant study of platform operations over a period of months before it was finally perfected.

"The "J"-type box eliminates the human element. The coin does the work and each coin deposited in the slot gives instantly an audible and visible registration at its value. It provides means for making positive inspection. The conductor is accorded ample means for observation of fares deposited. He can see, in most all cases, what is being placed in the slot; if he is not certain, he has the facilities of the intermediate inspection plate within the fare box. The coin, after registration, drops upon this plate, where clear visibility is afforded, and the coin remains in this position until it is released by the following coin.

"The instantaneous feature of registration occurring with the coin itself provides for maximum collection of the passenger revenue. We are advised that on the Brooklyn City Railway lines, after these devices had been in operation one year, the revenue increase attributed to the Johnson box is 4 per cent. This expressed in terms of money approximates $500 per year per car equipment, which in turn represents in round figures four times the cost of the entire equipment. I do not know of any equipment investment that pays a higher return.

"The speed with which the passenger boards the car and makes fare payments is most gratifying. It has shown conclusively on the Brooklyn operation and on the Public Service of New Jersey, where a test has been in progress for some months, that this box speeds in double-quick time the platform passenger movement and affords a splendid contribution to time saving.

"It has its attraction from the public viewpoint too. The rider appreciates the opportunity of quick fare payment and his uninterrupted passage into the car, where vacant seats may be few. Psychologically, there is a thrill in hearing the bell ring in the register; it is an innovation and it is these things that please. It helps to bring home to the riding public the advantage of having exact fare ready."

In the discussion which followed, C. E. Morgan, president of the association and vice-president and general manager Brooklyn City Railroad, confirmed the statements made concerning the successful experience of his company with automatic fare boxes. H. G. Tulley, president International Railway, Buffalo, said that his company abandoned the use of fare boxes last November. It was felt by the management that the conductor had a better chance to get fares from all passengers if he collected them personally. With multiple-coin fares particularly it is difficult, he said, to be sure that each passenger deposits the right amount. E. M. Walker, president Schenectady Railway, concurred in part. He said that while the fare box is probably ideal for single-coin fare collection, it is not entirely satisfactory with multiple-coin fares.

Freight Traffic

"Freight Traffic — Its Source and Developments," was the subject of a paper presented by F. W. Brown, general superintendent Michigan Railroad, Grand Rapids, Mich. An abstract of this paper appears elsewhere.

In the discussion on this subject F. W. Watts, general express agent New York State Railways, said that his company had put in operation motor trucks supplementing the electric lines and primarily for short-haul service. The trucks had been in service for so short a time that no definite figures could be given as to the financial results. In some cases, shippers had expressed a preference for trucks rather than electric cars, even at a higher rate, because better speed could be made. The longest route on which these trucks are being run is 22 miles, and service is given to some places which are not reached by trolley.

H. C. Stanton, general freight and passenger agent Rochester & Syracuse Railroad, said that company was making a study of the truck business, but as yet had not engaged in it.

T. C. Cherry, general manager Rochester & Syracuse Railroad, suggested the association should take the position that motor trucks engaged in the general transportation of freight should be classed as common carriers by the state and placed under the supervision of the Public Service Commission. This suggestion, on motion, was referred to the legislative committee.

There was no discussion on the paper on "Light-Weight Interurban Cars," by W. J. Clardy. This appears elsewhere in this issue.

Light-Weight Interurban Cars

In the absence of J. M. Bosenbury, his paper on interurban one-man operation on the Illinois Traction System was read by W. J. Harvie, vice-president of the association. An abstract appears elsewhere in this issue.

In a written discussion F. E. Fisher, general manager Illinois Valley division, Illinois Traction, Inc., described some of the things that have been done to facilitate one-man operation with these cars. Spring switches have been installed at all meeting points and overhead frogs at the turnouts. Where single-end sidings are in use the spring switches are so arranged that the operator of the car first arriving at the meeting point can unlock the switch, go into the siding, reset the switch for the main line and then after the other car has passed can back out and proceed without leaving his position on the car. For train dispatching jack boxes have been placed on the poles with telephone sets on the cars. This permits the same train-order system to be used as with the two-man cars. Fare collection is done with Ohmer registers, which are worked by pedals and are so placed that the majority of the passengers can see the reading. Hat checks are issued by the conductor and are collected when the passengers leave the car.

George L. Kippenberger, assistant manager St. Louis Car Company, sketched the extreme conditions of competition now existing due to the development of highway transportation methods. He mentioned the demand that exists among the public for "something new." This has been satisfied to a considerable extent by the motor bus. He feels that an interurban car with

the same features as those which have been adapted to the de luxe type of interurban bus would draw passengers back to the railway, as it is possible to make them materially better than can be done with vehicles running on the highways. Following the formal discussion a moving picture was shown illustrating the actual operation of the Illinois Traction cars that had been described.

In the informal discussion which followed, J. C. Thirlwall, General Electric Company, remarked that while until recently 1,000 lb. per mile per hour of free running speed was considered the lightest weight that was feasible in an interurban car, recent cars have been built weighing not more than 40,000 lb. for a maximum speed of 50 m.p.h. The reorganized Buffalo & Erie Railway has just begun operating cars weighing 37,000 lb. at a speed running well over 50 m.p.h. With good weather, he said, it would be possible to bring the maximum speed up to 60 m.p.h.

The old idea was that light-weight cars were inherently flimsy. Modern light-weight types, however, have proved satisfactory. The Western Ohio Railway is operating 34,000-lb. cars which stand up well in high-speed service. A similar record has been made by the Dallas-Terrell line. The maintenance of 34,000-lb. cars on this line has been brought to a very low cost. The Kentucky Traction & Terminal Company is operating similar cars up to speeds of 40 m.p.h. After making 330,000 miles per car, the maintenance cost last year, which was the third year of service, was at the rate of 1½ cents per car-mile.

Carl H. Beck, Westinghouse Traction Brake Company, pointed out the necessity for very high braking rates for all cars that have to run in city street traffic. This demand has been met by the variable load brake, which permits the same braking ratio for a full car as for an empty car and makes possible much quicker stops in traffic with resultant reduction in accidents.

An interesting paper on "High-Voltage Insulators and Their Relation to Radio as Affecting Railways" was read by G. B. Smith, engineer Ohio Brass Company. He spoke of a number of the problems of insulation of power transmission lines at 100,000 volts and over. The interference with radio reception produced by imperfect insulation has resulted in finding many defective insulators. He cited a case where radio co-operated to locate a section of track where the bonding was poor, so that the railway was able to correct the difficulty. An interesting development mentioned by Mr. Smith was the use of high-frequency currents for telephoning over power transmission lines. He said that this made it possible to transmit messages where the use of ordinary telephone lines was impossible and assisted materially in assuring continuity of power service. Following the presentation of his paper, Mr. Smith showed a number of lantern slides illustrating different methods of controlling high frequency discharges and the effects of screening to prevent flashovers.

A paper describing the development of gas-electric buses was presented by J. C. Thirlwall of the General Electric Company. This was discussed by J. A. Queeney of the Philadelphia Rural Transit Company. Abstracts of this paper and the discussion are published elsewhere in this issue.

Dr. F. S. Macy of the Brooklyn-Manhattan Transit Corporation presented a paper in which he discussed the essentials of discipline. This also is abstracted elsewhere in this issue.

The afternoon session was concluded by a short progress report by the accountants' committee of the association, which was read by its chairman, E. H. Reed, auditor Brooklyn City Railroad.

The principal speaker at the dinner was Clifford E. Paige, vice-president Brooklyn Union Gas Company, who said that public sentiment was changing in favor of the public utilities since they have been giving more attention to winning the confidence of the public. The street railways are now advertising their business more extensively than ever before. Their best salesmen, however, must be "contact men"—conductors or motormen. Courtesy, he said, is never an accident but always a development, which should be fostered in all those having to deal with the general public.

President Morgan announced that this was the largest meeting the New York Association ever held, some 750 being present at the banquet. Nine past-presidents of the association were in attendance. J. K. Choate responded for these past-presidents with a few fitting remarks. The meeting concluded with a humorous address by the Rev. W. W. Giles of East Orange N. J., who spoke on "Personality—The Business Man's Greatest Asset."

Interurban Freight Traffic—Its Source and Development*

Importance of Developing Additional Source of Revenue for Interurban Properties—Use of Motor Trucks in Connection with Electric Railway Lines Opens Up New Possibilities—Joint Rates and Through Billing Important

By F. W. Brown
General Superintendent Michigan Railroad, Grand Rapids, Mich.

FREIGHT traffic handled by electric lines in the last 10 years has increased fourfold, the freight car-miles operated have increased two and one-half times and the freight equipment has been doubled. This of itself ought to be a convincing argument in favor of freight traffic as an undeveloped source of revenue.

Many electric line managers now recognize that the greatest opportunity for development lies in freight service, and realize that the standardization of equipment, the possibilities of more through and competitive rates between cities and stations, the operation of longer trains, and the loading of cars to capacity are all important factors to successful and profitable freight transportation.

There are still a number of difficulties that have not been overcome, not the least being that so many of the lines operate over city tracks, and are therefore subject to municipal regulations as to the hours during which they may haul freight cars, or the number of cars in such train, also the type of equipment required by such municipalities.

On the side of personnel, it is important that all the employees be efficient. One incompetent or disagreeable employee coming in contact with the public will offset the work of several capable and excellent men. To be more specific—I would say that one local freight agent who is curt, or has not the faculty of meeting and pleasing the public, can do more harm than can be overcome by several solicitors, or by several months of first-class service. Therefore, the right men should be engaged as local freight agents, the right sort of solicitors put in the field, and the right men to handle freight claims are essential to the success of the undertaking. To be too saving in salaries at this point might easily be fatal to the whole project. Any solicitor who cannot increase the business five times over and above his salary is in the wrong field.

*Abstract of a paper before the New York Electric Railway Association, New York City, Jan. 22, 1925.

Sources of Freight Traffic

Where can we look for traffic? First, in our own immediate territory; second, in adjacent territory. It is astonishing how much new business a solicitor will find in a territory that he has worked over and over again, by knowing intimately all the sources of traffic, and the men who control it, and by acting promptly on tips he receives, or things that come under his observation, often accidentally caught from some casual source.

Another feature, and one which has not been greatly developed, is to use truck lines for reaching towns not now served by electric railways. From nearly every terminal of any importance there are truck lines operating to villages and towns within a radius of 30 miles, that should become feeders of the electric line, through rates and through billing being provided. In other words, the truck line in this case would become an extension of the electric line. There is no reason to believe but that such service can be successfully developed, and is one of the fields now open to electric lines. Any number of localities not well served by steam roads on account of their location on branch or short lines would be susceptible to a far greater develop-

ment if they had better transportation facilities. It is not meant by this that the truck, in connection with electric lines, is expected to deprive the steam railroads of their business, but that with additional transportation facilities there will be more traffic to move. This co-ordinates the truck and the electric railway to the mutual benefit of both.

Electric railways should endeavor to locate industries on their lines, and while it has not yet become possible in all cases to handle standard M.C.B. equipment in road haul, as all lines are not physically able to do so, and also because of the objection of steam roads to pro-rating with electric railways, for the present revenue may be obtained from handling such equipment in a switch movement. However, we should not say that the electric lines should not expect to be able in the not far distant future to move traffic in connection with steam railroads. There are a number of the larger steam lines which have fought this for years, but there are signs of a break among some of the other lines, and I believe it is not impossible, with the right kind of effort, to establish joint rates in connection with certain steam lines, very much to the advantage of the electric. In view of the experience of the past this may seem a bit visionary, but it is not so; we have not gone after it half hard enough.

Another opportunity that is opened can best be presented by relating an actual experience: An electric railway served a celery-growing district and had for a number of years counted on that business as certain. It was regular until the motor truck came into the field and picked up the celery at the grower's place and transported it direct to the market, some 25 miles distant. The representative of the electric immediately started to develop another market for this celery and, after bringing the commission men from another city and growers together, succeeded in developing a business the second season that totaled 100 carloads. The new market was 200 miles distant and is not likely to be affected by the motor truck.

Through Rates Important

Through billing and competitive rates should not be overlooked. Agents should be able to quote promptly the through rate to as many points as it is possible to establish. A truck haul between two terminals may be necessary, but that can be arranged; make the truck line part of the through transportation and participating in the through rate; but where lines can be made to connect, through cars should be run.

These cars should serve the double purpose of affording the shipper the through service and saving the cost of frequent handling. Every time a shipment is handled it adds from 50 cents to 75 cents to each ton so handled, depending on the volume. The through rate, and especially the through service, appeals most to the shipper and increases the importance of the electric railway in his mind.

One other matter I should like to mention. That is to appeal to managers not to handicap their traffic departments by failure to furnish facilities for the development of freight traffic. Many a traffic manager has become discouraged when he sees where business can be obtained but cannot be handled for lack of terminal facilities, or other conveniences necessary. Additional facilities, oftentimes provided with the expectation that such would take care of the needs of the traffic department for some time, are found to be taxed to their utmost in a very short period after being provided.

Essentials of Discipline*

Principles Underlying the Methods Used by a Large Electric Railway in Obtaining Loyalty and Co-operation from Its Employees

By F. S. Macy

Physician-in-charge, Medical Bureau of the Brooklyn-Manhattan Transit Corporation, Brooklyn, N. Y.

DISCIPLINE is essentially teaching, training, the cultivation of some particular belief or code, education in some especial occupation or profession. Industrially, discipline is any method, system or kind of training designed to accomplish profitable results by regulated, co-ordinated, combined efforts.

Good discipline begins with the proper selection of employees. Given the men, the next point is in recognizing the principle that control of the mass is based upon the control of the individual. All discipline narrows down to that. And the secret of controlling the individual lies in knowing and in understanding every employee to the limit of our ability in that art. In addition certain conditions must be fulfilled or fostered as the case may be. For instance, respect for himself and his boss; for he cannot give the full measure of return to his company unless he respects it, and he cannot respect it unless he honors himself in working for it. And he must respect his boss because he is a disciple of the boss, who, to him, the employee, typifies the company. Courtesy is one road to respect. "Please" and "Thank you" are the most powerful words in industry. They make unnecessary many pages of rules, because they prompt consideration and forethought.

Courtesy, to be exacted from the men, must be punctiliously extended to them by their chief. A man must not be treated like a yellow dog if he is expected to act and to work like a thoroughbred. Before a man can respect himself and act like a man, he must be treated like one. Even in reprimand, cold, calm courtesy is a weapon that baffles all offenders because it admits no rebuke in reply.

An employee must be loyal, otherwise he is an indifferent worker and a mere time server, so that his product falls below the standard of excellence that it is the object of discipline to maintain. Loyalty, like respect, is mutual if it is genuine. It is the cultivation of this spirit, mutual respect, mutual loyalty, mutual confidence in and fidelity to one another and the common code, that forms the basis and the very structure of military discipline and national security. We can have no better model.

It is usually easy enough to get men. It is quite another thing to keep them, to train them into a high state of efficiency and to hold them after they are trained and hence most valuable. Nothing else helps in this respect so much as these few principles so briefly outlined. The individual must be intelligently studied and analyzed, so that he may be fitted into his right place as a cog in a machine; he must respect and be respected. He must be loyal, and the company must be faithful to him. The net result is an appeal to the sense of personal possession. The man comes to look upon the company as something so intimately associated with himself as to be, in a sense, his own; the object of his affection and pride, upon whose prosperity his own depends, in the spirit of which he lives and for which he would die, and not seldom does, especially in the railroad industry.

So much depends upon the superintendents or the immediate bosses of the men in cultivating the essential qualities of concerted effort that a corporation is largely what these men make it. Personal bias or preference manifested in the guise of office are fatal to discipline. The privileges the boss confers, the preferments or promotions he recommends must have no foundation of friendship. On the contrary, to promote, for example, a man on his merits but known to be personally distasteful to the boss, is a master stroke of discipline when the occasion justifies it; because it is a visible evidence of a square deal, an advance untainted by personal considerations. And just as he must not be influenced by personal favoritism to confer privileges, so, too, he must not use his official position to obtain favors for himself. To borrow money from subordinates, for example, or to gamble with them, is worse than dangerous.

Yet the personality of the chief is bound to be reflected in his performance of duty, nor do I maintain that it ought not to be. Indeed, the right kind in the right way is necessary. Neither do I mean that he should not do humane, kind things officially when I say that his office is impersonal. On the contrary, he should study to do those things for reasons I have given. But I do make a distinction between personality in the sense of character and personal attributes as biasing factors in office.

When I say that the chief should be approachable I have in mind what I call the open-door policy. This consists simply in giving every man a hearing

*Abstract of a paper before the New York Electric Railway Association, New York City, Jan. 22, 1925.

no matter how perfectly the merits of his case may be known. If for no other reason the practice is desirable because it adds to general confidence, and to the chief's fund of information about men in general. One can always get a new viewpoint, useful, perhaps, on some other occasion. Besides, no matter how thoroughly subordinates are trained in the policies of the boss, as they must be, differences are bound to arise and it is one of the most important duties of the chief to see that these are adjusted.

Occasionally it will be found that the man is right and the chief's assistant wrong. In such cases the assistant must always be sustained, in appearance. The chief should hear all parties concerned and then follow up the case to conclusion, as an added source of information concerning the qualifications of his personnel, and to assure himself that justice has been done. He must also be equally scrupulous in analyzing himself and in correcting such mistakes as he himself may make. It takes a big man to say to his inferior, "I am wrong in this case," but he seldom loses by doing so.

The open door naturally suggests the closed door; in other words, punishment, which is often confused with discipline itself. Appreciation, commendation, appeal to the common spirit, are often far more effective and better means politically of securing or maintaining discipline. Nevertheless, punishment is a valuable and necessary aid in appropriate cases, though theoretically it is a confession of weakness, an admission of inability to cope with a situation intellectually. Sarcasm, loud bawling, angry epithets, are cowardly and weak because they admit no official reply or explanation and reduce a judicial process to a personal quarrel. For the same reasons, no man should be allowed to be impudent or disrespectful to his chief. The boss should put him out and resume the matter when, and as soon as, it can be settled coolly and judicially; and if he finds his own gorge rising to the spillway he should promptly dismiss his man until he can control himself.

Know everything that is going on; not by spying or through spies, but in the open with keen ears and keener eyes. Let praise or approval be bestowed in the open. But let reproof and reprimand be administered behind the closed door. Public humiliation destroys self-respect and antagonizes all who witness it.

Punishment or penalties should seem to be the natural consequence of the offence. They must therefore be appropriate, even ingenious, and duly proportioned to the circumstances, but never degrading.

Discharge is a terrible thing, both economically and humanly. It deprives the company of a man more or less trained, and it causes human suffering. Yet it is necessary at times, for the good of the whole. It has but one legitimate function, the elimination of the hopelessly unfit, the incurable agitator who undermines the common prosperity and the man who has proved himself temperamentally or otherwise not amenable to any constructive influence. But remember that the incorrigible and the incompetent may be only square pegs jammed into round holes.

One cause of resentment among men at being penalized is the feeling that the boss is on a plane so much higher than themselves that he cannot understand them. To overcome this I devised what I called a "Discipline Board," composed of an odd number of men with excellent records and suitable qualifications in general. Complaints and infractions were referred to this board. I retained the approving and amending powers, for obvious reasons, and made it plain that the board was advisory only. I often mitigated, but I never exceeded their findings if these were adverse to the man concerned.

This board accomplished several things. Men felt that they had been tried by a jury of their peers, and there was never a question of fair treatment. Membership on the board was an expression of the highest commendation and furnished a wonderful incentive to good work. It provided me with a number of men undergoing practical training in the judicial side of management from whom I could choose a tested assistant as occasion arose. It operated as a buffer between the men themselves and the consequences of individual prejudice or misunderstanding. It strengthened rather than weakened my own position by promoting contentment and inspiring confidence in me as a man and an official. Incidentally it saved me some terrific strains on my temper.

Now comes the question, how may one judge whether discipline is good or bad? Here are a few tests:

Is the quality of the output what it should be?

Do the men work willingly and come to their duties promptly and cheerfully?

Are there incentives such as the prospect of advancement, pension, etc.? In other words, can they see something ahead for themselves? These are essentials to contentment, and contentment is necessary to loyalty or company spirit.

What is their opinion of the boss? It ought to be that he is a fine man who can be hard as nails when occasion demands.

All things considered, is the labor turnover high or low? If it is high there is something wrong in working conditions. Too often it means injustice and wrong principles of control; poor production as a result of untrained and discontented workmen and consequently too high an overhead and lower profits.

Is the sick rate higher or lower than conditions warrant? The higher the rate the more likely it is that men are malingering to escape hateful conditions and that they are therefore lacking in loyalty. In general, too high a sick rate has the same significance as an excessive labor turnover.

Are punishments and penalties imposed in excessive numbers? A high punishment rate reflects discredit upon the boss, as a rule, and indicates a fault in his ability to understand and train his men. On the other hand, an exceedingly low rate must not be taken as an indication of high discipline without corroborative indications.

Finally, analyze every disciplinary incident. Take it apart and see how it is humanly made. There is a lesson in every one. Superintendents should discuss their difficult cases with one another; transfer them from one to another to observe the effect of change of environment and personality on efficiency. Indeed, if the art of discipline had been sufficiently cultivated in the beginning, the necessity for organized labor would never have existed; and if the art were even now as far advanced as it should be, the organized labor would have no justification. Discussions, experiences, opinions, all are productive. I offer you mine for such service as they may render.

Results with Light-Weight Interurban Cars*

By J. M. BOSENBURY

Superintendent of Motive Power Illinois Traction System, Springfield, Ill.

THE Illinois Valley division of the Illinois Traction System, consisting of approximately 101 miles of road, was originally built about 20 years ago. It was equipped with heavy double-truck two-man interurban passenger cars weighing approximately 94,000 lb. each and seating 56 passengers. These cars were operated on hourly schedules, but the decrease in business caused the operating officials to reduce the service to headways averaging about 2 hours, with few trippers morning and evening

An analysis of the factors involved showed that the solution of the problem was a light-weight one-man interurban car. With this idea in view, the officers of the company directed the engineers to design a car that would as nearly as possible meet all of the requirements of the traveling public. Comfort and attractiveness were considered most desirable. This was provided by use of more comfortable seats. better heating and ventilation, better toilet facilities, easier egress and ingress and a pleasing appearance, both inside and outside. The car was equipped with all of the modern safety appliances and labor-saving devices. While it was of light weight, strength and safety were not sacrificed to obtain the desired result.

It was also considered that the car must be of an entirely new design, that would embody all of the good features of past practices and at the same time all desired new developments, incorporated in a car that would appeal to the traveling public and also be easily operated on an interurban line by one man.

The resultant car in general is a single-end, double-truck one-man interurban car with arch roof, having the main passenger compartment at the front and with a combination smoking, baggage and express compartment in the rear. [This car was described and illustrated in the ELECTRIC RAILWAY JOURNAL for Jan. 10, 1925—ED.]

Particular attention was paid to insulating the car, both the roof and the side girder plates. To make the car

*Abstract of a paper before the New York Electric Railway Association, New York City, Jan. 22, 1925.

more comfortable in extremely cold weather, storm sash are mounted over the lower sash in long sections. These storm sash have small ventilators at the bottom, which may be operated from the inside of the car. The upper or Gothic sash are prevented from radiating heat by being protected on the inside with a ⅛-in. mahogany veneer panel, which gives a dead air space. This panel is hidden by the curtains which are arranged to stop with the lower edge at the top of the movable sash. This provides clear vision at all times. The car being single-ended, with the main passenger compartment in the front portion and without a front bulkhead, provides the passengers with a clear and unobstructed view of the track ahead and of the surrounding landscape.

The new service was started on an hourly schedule on Aug. 3, 1924, and operated in this manner until Aug. 20, at which time an unprecedented storm accompanied by a cloudburst washed out a number of bridges and embankments. These unfortunate occurrences cut the line into several sections, making it impossible to operate through cars and maintain full service. So much damage was done that the reconstruction of the bridges and track was not completed until Dec. 4. Therefore, sufficient operating statistics to show the value of this new service are not available. However, the manner in which these cars were received by the public and the officials of the communities through which they operate, and the many former patrons that had been lost to other forms of transportation that have returned to these cars, indicate that they are meeting expectations, and that portion of the December report that is available indicates increased earnings and decreased operating expenses, which latter was materially affected by a large decrease in power consumption.

Gas-Electric Drive for Buses*

Experience with Vehicles of This Type During the Past 20 Years Is Outlined—The Advantages Are Claimed to More Than Offset the Greater Weight and Original Cost

By J. C. THIRLWALL
Railway Engineering Department General Electric Company

MANUFACTURERS have been building various forms of gas-electric drives for rail cars, automobiles, buses, tractors and ships for 20 years or more, and a great deal of such equipment has been put into actual operation. In 1905 a single-deck bus was built for the Fifth Avenue Coach Company that was driven by a gas-electric set built by the General Electric Company. This weighed about 9,400 lb. and used a 40-hp. four-cylinder engine to which was attached a 12-kw. generator. Two motors were used with chain drive and a double-reduction gear, giving a maximum speed of 15 m.p.h.

Three years later 10 more buses were put into service by the Fifth Avenue Company, with similar equipment. These operated for about 6 or 7 years before being retired. The only criticism of their performance was the inferiority of their engines as compared with the De Dion type that had been adopted by the operating company for its other buses. Due to relatively lower engine speeds, the weight of the electrical equipment per kilowatt capacity was considerably higher than it is today. Nevertheless, these buses, designed throughout for the electric transmission, weighed only 347 lb. more than the buses with mechanical drive. A single-motor vehicle built in 1910 actually weighing 70 lb. less than the mechanical type, operated until 1917.

About this time the Tillings-Stevens Company in England began development along similar lines and since has carried it forward to a point where there are today in successful operation numerous fleets of these gas-electric buses totaling some 1,500, about 300 of which operate in London.

In 1912 we installed a considerable number of gas-electric equipments on heavy-duty trucks, notably airial ladder trucks for fire departments, street sweepers and commercial trucks of from 2 to 5 tons capacity.

In 1918, at the request of the War Department, we designed and built 90 mobile searchlight power units, one of which served at the front-line trenches in France. These trucks, weighing 9,000 lb., used an 80-hp. Cadillac engine and a 20-kw. generator and single motor. On test in February and March, 1919, one of these units went from Massachusetts to Florida and return, through exceptionally muddy clay roads, without a failure in any part of the driving mechanism. The first American tank had gas-electric drive, and two 80-ton 240-mm. gun mounts were similarly equipped.

During the same period, 1905 to 1915, we built some 90 rail car equipments, using 100-kw. generators with 175-hp. engines in combination passenger and baggage cars that weighed from 45 to 55 tons. A considerable number of these cars are still in active service after 15 years. Several of somewhat lighter weight have been sold during the past year.

An even more extensive commercial development was made in storage battery trucks, thousands of which are today operating in every class of commercial trucking. The American express Company, for instance, has a number of fleets of battery-driven delivery trucks aggregating some 1,600.

About a year ago Mitten Management, Inc., having decided to engage extensively in bus transportation before, and realizing the disadvantages of the standard mechanical drive, asked us to submit a sample gas-electric equipment that would enable it to dispense with the differential and to use a dual drive. It felt, as many other operators do, that the differential itself is an inefficient and weak part; that it promotes skidding and wheel slippage in starting on slippery streets; that the hump in the center of the axle necessitates carrying the body higher than is necessary with dual drive. To build a mechanical dual drive appeared impracticable. With electric drive, it merely meant the use of two motors, mounted side by side and connected to two driving shafts.

Other objections to the ordinary automotive drive are the clutch and gear shift, which are short-lived, high maintenance parts. Moreover, as ordinarily used by drivers, they are weapons of mechanical assault and battery on the engine, chassis frame, bearings, and tires. In other words, the ordinary rapid acceleration of a heavy bus, with a gear shift, is a series of terrific torsional strains and of excessive engine speeds, that shorten the life of the engine, of the gearing, of the tires and of the whole vehicle.

Electric drive reduces the severity of the torsional stresses, applies the power in a smoother and more constant manner, greatly reduces the peaks of engine speed, and in frequent stop service appreciably reduces the number of engine revolutions per mile. The reduction in speed permits the use of higher compression and, together with the higher thermal efficiency of moderate engine speeds, results in fuel economy.

In frequent-stop service a driver will make from 1,500 to 2,000 shifts of the gears in a 9-hour day. The physical and mental strain of performing this duty is considerable. In addition, each shift requires that the driver take his hand from the wheel, and to some extent distracts his attention from the steering of his car. With the electric drive the entire speed control is in the foot accelerator and he need never take either hand from the wheel except to apply the emergency brake.

For the reason just mentioned, and because there is less danger of skidding, the passenger rides in greater safety. He is less apt to be thrown while standing in the aisle as a result of jerks in starting, and his comfort is enhanced by the lack of noise and vibration that is ordinarily so noticeable.

Equipment developed for use on the larger size buses, tests of which have been made in Philadelphia during the past eight months, includes a 25-kw. generator, weighing approximately 900 lb., directly connected to the engine. The particular engine used in the P. R. T. tests was a six-cylinder machine that developed 60 hp. at 1,200 r.p.m.

On its shaft has been mounted the armature of an exciter provided to obtain instant pick up of voltage as the engine is accelerated. (One of the objections to previous designs was a lag in voltage pick up that reduced acceleration of the buses.) The generator has a main series field and an simpl shunt field that is energized

*Abstract of paper before the New York Electric Railway Association, New York City, Jan. 22, 1925.

by the exciter. The series windings build up a magnetic field in opposition to that created by the shunt winding, giving a nearly constant power, the voltage drooping at high current output and increasing as the current drops. There also is a neutralizing effect at low speeds, so that when the engine is idling the voltage generated is so low as to produce a negligible current throughout the motors. They can, therefore, be permanently connected to the generator.

While the generator has a nominal rating of 25 kw. in actual tests, its output varied from 500 amp. at 70 volts, or 35 kw., to 160 amp. at 200 volts, or 32 kw. Under tests that boiled the radiator of the driving engine it operated within safe temperature limits.

Two motors, weighing 440 lb. each, of the automotive type, barrel shaped, and of about 20 hp. on a railway rating, were used in these tests, with a double reduction gear ratio of 10.8/1. With this combination on a double-deck bus, which without load weighed 16,870 lb. and with full load approximately 26,000 lb., free running speeds of from 26 to 30 m.p.h. were obtained, depending upon the loads carried.

Rates of acceleration were very uniform, approximately 2 m.p.h.p.s. up to 10 m.p.h. and 1.5 m.p.h.p.s. up to 15 m.p.h. being the average of many tests. It was found that the buses with mechanical drive could equal these rates, but only by racing the engine through holding too long in intermediate gear positions. The normal engine speeds while accelerating with the gas-electric drive were between 600 and 1,300 r.p.m. The maximum engine speed (at 30.5 m.p.h. bus speed) was 1,550 r.p.m. On hill-climbing tests, on grades of from 5 to 8 per cent, the engine speed varied only between 1,150 and 1,325 r.p.m.

With mechanical drive on second or third gear position engine speeds of 2,000 to 2,200 r.p.m. were frequently reached, and readings as high as 2,600 r.p.m. were noted, depending on the individual driver and his methods.

Schedule speed tests gave similar results. On various runs involving from three to nine stops per mile the drivers of the gas-electric bus established uniform records of schedule speeds. It was found that for short periods drivers on the mechanically equipped buses could, by abusing the equipment, get over the course in approximately the same time, but they all admitted that to maintain such schedules all day would be physically impossible.

The electric equipment and the dual-drive axle add some 1,800 lb. to the weight of a 66-passenger bus, less than 8 per cent of its loaded weight, and approximately 10 per cent of its first cost. Those are the only apparent disadvantages.

Against these may be set the greater comfort and safety for passengers and crews, lower maintenance and reduced depreciation on the entire bus and its equipment, greater mileage per gallon of gas or of oil, and higher schedule speeds.

Philadelphia's Reasons for Gas-Electric Buses*

Constant Starting and Stopping of Buses in City Service with Clutch and Gear Shift Produces Strains in Body and Chassis That Result in Mechanical Trouble and Short Life of the Bus

By J. A. QUEENEY
Philadelphia Rural Transit Company, Philadelphia, Pa.

SIX weeks ago the Philadelphia Rural Transit Company, which is the motor coach organization of the Philadelphia Rapid Transit Company, purchased 200 gas-electric motor coaches, 125 of which are 66-passenger double-deck coaches and 75 of which are 33-passenger single-deck coaches. The Mitten Management has been studying the subject of motorcoach operation for several years. During these studies the conclusion was reached that in cities where motor coaches are in operation the street railway continues to carry a certain proportion of the people transported over the streets of that city and increases that proportion as the population grows. In cities where motor coaches are not in operation, the percentage of the people carried by the street railway decreases as the population grows, or, in other words, the private automobile increases in number and carries a larger part of the people transported over the city streets. With these facts before up, Mitten Management decided to supplement its railway system with the motor coach.

With a few exceptions, the type of buses in operation in various cities was really a truck chassis with a body mounted on it. We found it to be the opinion of bus operators that the life of the bus was somewhere between 3 and 5 years, a most startling situation to us who are accustomed to dealing with street cars whose life is admittedly not less than 20 years. We found that not only was the life of the bus relatively short, but its operating costs much higher than those of a street car of the same capacity, so we devoted much time to find the reasons for the shorter life and the higher cost of the motor coach.

In the Dec. 13 issue of ELECTRIC RAILWAY JOURNAL appeared an article by B. Hilburn, general manager Tulsa Street Railway, Tulsa, Okla., which summarized the defects of the ordinary mechanical drive of the gasoline bus and the rapid deterioration of the vehicle that results. This sums up in a few words one important reason why we decided to adopt the electric drive instead of the mechanical.

As a result of our studies we drew up what I might call fundamental specifications covering a gas-electric double-deck coach that would seat not less than 65 passengers and a 33-passenger single-deck coach the chassis of which would be an exact duplicate of the double-deck for the purpose of standardization. Our specifications stated that the electrical apparatus must have sufficient capacity to transmit the entire output of the six-cylinder 4x6-in. engine which we had designed and operated in order to demonstrate its advantages over the four-cylinder type.

The General Electric Company supplied all electrical equipment for the first coach, which consisted of generator, two motors and a reversing switch. The clutch, gear shift, transmission and rear axle of one of our 64-passenger double-deck coaches were removed and the generator and two motors substituted.

We placed the gas-electric coach on test alongside of an exact duplicate coach equipped with identically the same engine and conducted a series of tests extending over a period of months. We found that the gas-electric coach would accelerate rapidly, smoothly and quietly, being free entirely from the noise, shocks, stresses and strains set up in the mechanical drive coach, because of the abrupt changes in speed and torque as gears are shifted, depending largely upon the skill of the driver of the mechanical bus.

Incidentally, we learned that it was adsolutely impossible to stall the engine of the gas-electric; i.e., with the coach at rest, you can instantly push the throttle wide open and the gas-electric coach will automatically accelerate to its free running speed rapidly, smoothly and quietly.

The faster schedule that can be operated with the gas-electric coach, because of the elimination of the time required in operating clutch and gear shift, is most important when we consider that our largest item of operating expense is trainmen's wages, which of course are materially reduced as the schedule speed is increased.

All of our tests and operation to date indicate, and I am convinced, that the tire mileage of the electric drive coach is very materially greater than the life of the same tires on the same coach with mechancial drive, due to the even torque applied to the wheels of the electric drive, while that of the mechanical drive is subject to great variation.

We are convinced that the operating cost of the gas-electric will be materially less than that of the mechanical drive and we base our opinion on our knowledge of the cost of operation of mechanical drive coaches as compared to the gas-electric drive in Philadelphia and various parts of the world, the cost of operating our trolleys and other electric vehicles, together with those facts which have been established during our tests.

I think that it will be interesting to call the attention of our mechanical men to the fact that at present it is the practice of motor coach operators to inspect the coach after it has operated 2,000 miles. This is a purely arbitrary decision. The inspection is a most costly one and includes removing of head of engine, cleaning out carbon, cleaning and grinding of valves, renew-

*Abstract of discussion before the New York Electric Railway Association, New York City, Jan. 22, 1925.

ing of oil, tightening of bearings and inspection and adjustment of numerous other parts. After the inspection is complete it is doubtful whether the engine is in such condition that it will operate at an efficiency of 90 per cent, 80 per cent or 70 per cent. The mechanic simply knows that the carbon has been cleaned out, that the valves looked good and that the engine is operating smoothly, without knocking. After it is operated 2,000 miles it is brought in again and the same procedure gone through, without knowing whether it is necessary or not. With the gas-electric the exact condition of the power plant can be readily determined by simply connecting the generator to a water rheostat, taking the speed of the generator, and the output at once determines the exact efficiency of the power plant.

The inspection and adjustment of the gas-electric equipment is therefore based scientifically on the work actually performed by the vehicle and not arbitrarily based on general experience. To obtain the same information with the standard mechanical-drive coach it would be necessary to remove the engine of the coach and connect it to a dynamometer, which of course is prohibitive because of the expense involved.

Gas and Oil Consumption on Gas-Electric vs. Mechanical Drive

The question that has been asked more often than any other, and consequently I assume is of great importance in the minds of those who make the inquiry, is, "Is the gas and oil consumption of the gas-electric greater than that of the mechanical drive?" I am afraid that many of the engineers and motor-coach operators have given more thought to the problem of increasing the miles operated per gallon of gas and oil than they have to the reduction of other expenses that go to make up the operating cost. As a matter of fact, the oil consumption of the engine of the gas-electric is approximately but 50 per cent of that of the engine of the mechanical drive, which the gas consumption is approximately the same, slightly in favor of the gas-electric.

The gas-electric coach has this further advantage, which is probably of particular importance to the operators of the smaller properties, and that is that the gas-electric with its motor drive is much closer to a street car and therefore in operating and maintaining it there will be less departure from standard street railway practice, particularly in the maintenance of the equipment, than with the standard mechanical drive bus, so that your present street railway equipment organization, because of its familiarity in the maintenance of electrical apparatus, will have no difficulty in caring for the gas-electric equipment.

On the contrary, the standard mechanical drive bus, in my judgment, requires a new force of men trained and experienced in the maintenance of the clutch, transmission and differential, which is entirely foreign to street car equipment.

Light-Weight Interburban Cars*

Results from Thirty-eight Properties Show Marked Economies and Other Gains—Most Desirable Features of Equipment Are Discussed

By W. J. Clardy
Railway Engineer
Westinghouse Electric & Manufacturing Company

During the past 3 years a number of interurban properties replaced rolling stock with modern light-weight equipment and several interesting types of cars are now in service. An analysis of car weights between 25,000 and 60,000 lb. on 38 interurban properties which have purchased new equipment in the past 3 years indicates that the cars may be divided into three classes: (1) 25,000 to 32,000 lb. cars; (2) 32,000 to 40,000 lb. cars; (3) 50,000 to 60,000 lb. cars.

The first class includes 80 cars in service on 15 properties, and the average weight for this type of equipment is 28,000 lb. complete. The application of these cars has been confined to properties that have comparatively low schedule speeds which do not require free running speeds in excess of 45 m.p.h. Twenty miles per hour is a representative schedule speed for this class of service.

The average weight of the cars in the second group is 36,000 lb. complete, and a total of 152 cars distributed among 17 properties are considered. Most of the service performed by this equipment is of the same character as that in which the 28,000-lb. cars operate, that is, comparatively low schedule speeds requiring balancing speeds not exceeding 45 m.p.h. However, on a few properties, the 36,000-lb. equipments are applied in what may be termed high-speed service. In these instances schedule speeds of 30 m.p.h. are made, and the cars are capable of attaining free running speeds of 55 m.p.h.

The purchase of cars of the third class has not been extensive. Six properties are considered that are operating 137 such cars, and the average weight of these equipments is 57,000 lb. complete. Seventy-three per cent of the cars are in service on one property, and 84 per cent are applied where service is of a suburban character that does not require high speeds. The service is similar to what has been classed as comparatively low-speed operation, where schedules of 20 m.p.h. are typical and maximum free running speeds of 45 m.p.h. are not exceeded. The remaining equipment approaches the minimum weight limit of the 57,000-lb. class and has been applied to replace heavy cars in high-speed service requiring balancing speeds of 55 m.p.h.

The cars in the first two classes are representative of the lightest interurban equipments, and it is interesting to see that the average weight of 232 cars on the 32 properties is 33,000 lb. complete. Another important fact is that cars have been built corresponding to all of the even thousands in weight between the limits of 25,000 and 40,000 lb. This variation indicates that it is not practicable to establish definite weight standards for interurban cars to meet certain service requirements. However, the average weights as determined for the three classes will assist in the selection of cars and car equipment.

*Abstract of paper before the New York Electric Railway Association, New York City, Jan. 22, 1925.

Electrical Equipment and Trucks

The application of motors to the three classes of cars considered is instructive in that the influence of weight and service requirements are very definitely pictured. Seventy-nine per cent of the 28,000-lb. cars are equipped with quadruple 25-hp. motors, and the remaining 21 per cent have quadruple 35-hp. motors. In all cases the weight of the cars which are equipped with the latter motor exceeds 31,000 lb. Eighty-eight per cent of the cars in the second or 36,000-lb. class are equipped with quadruple 35-hp. motors, and quadruple 40-hp. motors are applied on 12 per cent. The 40-hp. equipments are used on high-speed cars, and tapped field motors are utilized to obtain good free running speeds on cars which approach the maximum weight limit. In one case the application of the 35-hp. motor on a 34,000-lb. car provides a fairly satisfactory high-speed equipment, but the 40-hp. motor is better suited for this class of service.

The principal equipment used on the 57,000-lb. cars consists of quadruple 50-hp. motors. Eighty-four per cent of the cars considered in this class have this size motor, and 16 per cent are equipped with quadruple 60-hp. motors. In general, the 50-hp. motors are applied on the moderate speed cars, and the 60-hp. motors on high-speed cars. Tapped field motors of the larger size are used in several instances to assist in obtaining the desired high free running speeds.

Remote control is favored on the equipment in the 57,000-lb. class for either single car or multiple-unit service, and drum control is more extensively applied on the lighter cars when operation does not require trains. However, some of the properties which have heavy traffic and are operating the lighter types of equipment use multiple-unit control to solve their problems of mass transportation successfully. They have found that train operation provides the best means of handling a large number of passengers economically.

One interurban road operates a 10-mile line joining two moderate-sized towns which are manufacturing centers. New 36,000-lb. cars equipped with qaudruple 35-hp. motors and multiple-unit control were recently placed in service and are proving very satis-

factory. Two-car units are provided to handle the heavy traffic to and from the industrial plants during rush hours. The excellence of the service secured from these equipments is striking when compared to previous operation with single cars. A Western property operating 59,000-lb. cars finds multiple-unit control a necessity to provide equipments capable of meeting the severe requirements of a heavy suburban traffic.

The small-wheel trucks which are practically a universal application on the class of equipment considered are well standardized and are very successful in providing good riding qualities. Twenty-six-inch wheels are used on 97 per cent of the cars, while the remaining 3 per cent have 28, 30, or 33-in. wheels. Truck springs require careful attention, for in a number of cases it has been necessary to make changes in springs to secure satisfactory riding qualities.

Car Fittings

In the light-weight interurban cars enumerated, careful attention has been given to the planning of every detail of the car body. The factors which have the greatest effect on bodily comfort are necessarily of first importance, and the principal items which have received exhaustive study are seat design, heating equipment, ventilation, type of windows and lighting system.

Plush seats are favored for main passenger compartments, and leather or some type of imitation leather for smoking compartments. On some cars folding slat seats are provided in baggage compartments for emergency use, but in general light-weight interurban cars are seldom in service where the entire seating capacity is utilized. The most comfortable seats are 38 to 40 in. wide, have high backs, employ deep automobile type cushions with substantial springs, and are spaced to provide ample knee room. Experience has shown that these are essential features, and the results obtained indicate that comfort rather than cost should determine the type of seat provided. There is no excuse for crowding seats on light-weight interurban cars as occurs in some cases, since capacity loads are seldom handled for long distances and consequently a slight loss of seating capacity is immaterial.

On single-end cars which have seats that are not reversible, the desirability of facing those adjacent to the smoking compartment forward and cutting the partition to obtain foot room is questionable. Some transportation superintendents favor the use of full-size seats facing the rear of the car, thus providing accommodations for two parties of three or four passengers who may desire seats together.

Electric heat predominates on the light-weight cars because it represents less weight, is easily controlled, maintains a good interior appearance and in most cases is effective in keeping cars warm. Hot water and hot air are used on some of the cars to reduce heating costs and provide better systems for severe climates. Where stoves are used, the most satisfactory location is in a fireproof baggage compartment, and this arrangement does not increase weight if carefully designed. On cars which do not have baggage compartments the completely inclosed stove is desirable, even at an increased cost, since appearance is improved and cleanliness assured. In one case a weight reduction of 600 lb. was realized by using aluminum piping for the hot-water heating system but, of course, this increased the cost materially.

Good ventilation is essential to the comfort of passengers, and on the most successful types of light-weight cars the ventilating system has been carefully planned. Improved visibility, reductions in weight and close fitting sashes represent some of the accomplishments in window design which tend to enhance interior appearance as well as reduce construction costs. A single window with metal sash is being tried on some cars and seems very satisfactory. A number of the light-weight equipments have lighting systems that show how an interior can be improved by a definite plan to obtain effective illumination with attractive fixtures.

Other features which assist materially in providing the most satisfactory equipments are commodious baggage and coat racks, linoleum-covered floors, large saloons, elimination of vibration and noise from doors, partitions, trolley bases, ventilators, and other parts, installation of match scratchers and ticket holders, application of aluminum for baggage racks, coat hooks, seat handles and seat strips, absence of all unnecessary overhead rods and cords and good interior finish.

Gains from Light-Weight Cars

The light-weight cars on the properties considered represent applications which involve the retirement of equipment weighing 30 to 200 per cent more than the new types. Old obsolete motors have been replaced by modern efficient machines that operate economically with low maintenance. In fact, every effort has been made to reduce operating costs with due consideration to the proper balance between service, comfort and economy.

Schedule speeds have been maintained or improved in most cases. In one or two instances the possibilities of high-speed service were not fully considered previous to the selection of equipment, and operation is handicapped by low car speeds. On one property quadruple 35-hp. motors are applied on 39,500-lb. cars, and the result is low speed cars which do not meet the service requirements satisfactorily. A better equipment in this case would be quadruple 40-hp. motors, suitable for high-speed operation.

The principal operating economies that are realized by light-weight car operation occur in maintenance of way and structures, maintenance of equipment, power and conducting transportation. Way and structure maintenance is directly affected by reductions in car weights, but it is difficult to estimate the credit due light-weight equipment or to determine the saving from actual operating costs without a long period of light-weight car operation.

Maintenance of equipment is indirectly affected by car weights in that the cost of repair parts are less, but the principal savings may be ascribed to the modern designs of car bodies, trucks, motors and control. Weight reductions affect energy consumption directly, and consequently power costs are lower when lighter cars are placed in service. A saving in the conducting transportation account occurs when it is practicable to operate cars with one man and thus reduce the platform labor cost. Fifty per cent of the 38 interurban properties considered operate their new light-weight cars with one man.

A Southern property which is operating new 25,200-lb. one-man cars instead of the cars weighing 65,000 to 70,000 lb. formerly used is saving 49 per cent in the cost of maintenance of equipment, 50 per cent in the cost of power and 46 per cent in the cost of platform labor. Bus competition which developed while the old cars were operating has been entirely eliminated by the improved service, and an operating deficit has been changed to an attractive profit.

A Mid-Western property which has installed a number of 51,000-lb. two-man cars in place of cars weighing 76,000 to 80,000 lb. has reduced its cost of operation from 48 to 34 cents per car mile, a saving of 29 per cent.

Factors for Consideration

A summary of the study of the various installations of light-weight cars indicates that there are several essential factors which must receive careful consideration to obtain the most satisfactory equipment:

1. The type of car must be suitable to perform the service requirements of the particular line or system on which it is to operate. The primary factors to be considered are schedules, character of traffic, and possibilities of one-man operation. Comparisons can be made with similar properties operating light-weight cars to assist in the selection.

2. A motor equipment is required with ample speed and capacity and also capable of meeting probable increases in schedule speeds after the new equipment is installed. Possible operation in trains to handle heavy traffic must be considered in determining the type of control equipment.

3. A careful study is necessary of all details of the design, particularly in connection with the car body so that every feature which influences the comfort and convenience of passengers will be included. The most successful types of light-weight cars now in service demonstrate the effectiveness of work of this kind on the part of operators.

Southwestern Association Meets at Houston May 5-8

THE convention of the Southwestern Public Service Association will be held at Houston, Tex., May 5-8.

This is a change from May 19-22, the dates which were formerly announced. Headquarters will be at the Rice Hotel, and reservations will be handled by the hotel management. W. E. Wood, Houston Electric Company, is chairman of the general convention committee.

American Association News

Mr. Shannahan Sees the Industry Healthy

A. E. R. A. President in Statement to the Press Reviews Progress of the Past Year—Traffic Trend Is Upward—Co-ordination of Electric Lines and Buses Encouraging

SINCE early last fall the traffic trend on electric railways has been definitely upward and the total business for the year will almost duplicate that of 1923, which set records for all time. This is the gist of the annual statement of J. N. Shannahan, president of the American Electric Railway Association, which was released to the daily newspapers Jan. 22. A banner year is predicted for 1925. The statement follows virtually in full:

STATEMENT OF PRESIDENT SHANNAHAN

Electric railways generally throughout the United States held their own during 1924. In the face of severe industrial depression early in the year, which in some communities decreased traffic 10 per cent, and an increase of 2,065,590 pleasure automobiles the record is remarkable. Final figures for the year indicate total passengers carried will be within 2 per cent of the 16,000,000,000 total for 1923, which set an all-time record.

City lines are recovering passenger business more steadily than interurbans. Substantial progress is being made, however, by many interurbans through freight business. Others are finding introduction of extra chair and dining car service and special excursion rates helpful.

The foregoing reflects only the general trend. There are both city and interurban properties, of course, which are experiencing extreme difficulties.

Today the traffic trend on electric railways is upward, as, indeed, it has been since early last fall, and indications for a banner year during 1925 are good. This because the electric railway curve invariably follows the general business trend, and it is agreed that unless the unforeseen happens business in all lines will be good.

Perhaps the most encouraging feature of the electric railway business today is the gradual but definite co-ordination of electric lines and buses. Very steadily electric railway managements throughout the country are assuming control of all local transportation, including both rail and motor lines, and co-ordinating it under one head. At the beginning of 1924 only 100 electric railway companies were operating a total of 1,000 buses in conjunction with their rail lines, but today there are 2,500 buses, owned by 170 different electric railway companies, in the field.

The bus is fitting into two distinct places. The first is in the extension of passenger service into suburban territories whose traffic does not warrant the extension of rail lines. The second is in supplementing established rail service.

These are the two logical fields for the bus, and all far-seeing transportation men realize it. The cry that the bus was about to supplant electric lines generally no longer is raised seriously by any one thoroughly familiar with the experiences of American and European cities. Of course the bus has replaced a few car lines in smaller communities—lines many of which probably never should have been built—but nowhere have they succeeded in supplying entire cities of any size with complete transportation.

Far-seeing electric railway executives everywhere are supplementing their rail service with buses where traffic warrants such action and enlightened public officials and citizens are co-operating with them in an endeavor to establish the best possible car-bus services. Under this new understanding the wildcat bus and jitney is rapidly disappearing through local and state legislation.

The pleasure automobile today is a far more serious competitor of electric railways than buses. How far they will go in competing against established transportation lines through giving "free lifts" at the risk of imperiling service remains to be seen.

ELECTRIC RAILWAYS NOW ON A SOUND BASIS

Underlying conditions with the electric lines are sound, as evidenced by the way the industry withstood the serious depression of the early part of the year. Although many industrial plants throughout the country either were closed down completely or in part, thus cutting into the regular car riders represented among office and factory workers, the operating ratio on the lines remained good. An increase of only two points, from 73.75 to 75.75, is shown. An increase of only 1 per cent is shown in operating costs, although wages alone were up 2 per cent. There were 65 wage increases, 13 decreases and 60 renewals without change.

Fares also increased during the year and exhibited a responsiveness to operating conditions, indicating anew that the old fixed fare idea has been eliminated. The average cash fare in cities of 25,000 population and over increased from 7.31 in January, 1924, to 7.49 in January, 1925, or about 2½ per cent. The January, 1925, figure represents a new peak in electric railway figures, the highest previous point in the average cash fare being 7.46, reached in November, 1921.

Another evidence of the healthy condition of the industry is the record of receiverships. Despite the fact that business depression and subnormal traffic conditions prevailed throughout the greater part of the year, only 13 street railways went into the hands of receivers, representing 1,022 miles of track and with outstanding securities of $75,000,000. Twenty-two companies, representing 1,650 miles of track and $176,000,000 of securities, were discharged from their financial difficulties.

A total of 312 miles of new track was constructed in 1924, being the largest single year's construction since 1918, and 712 miles of track was reconstructed. Total bus-mile extensions amounted to 2,870 miles, making an increase of more than 3,000 miles of service added by the electric railway companies during the year.

Abandonments amounted to 225 miles. No single abandonment, however, amounted to more than 29 miles, and the average for the 23 companies affected was slightly less than 10 miles each.

A survey made by the ELECTRIC RAILWAY JOURNAL indicates that $342,000,000 will be spent in 1925 by electric railways for new plant and equipment, maintenance, material and supplies. This total represents an increase of 30 per cent over the amount spent for similar purposes in 1924. A total of $75,700,000 will be spent for way and structures, $103,400,000 for rolling stock and equipment and $32,400,000 for power facilities. The balance will go for material, supplies and maintenance. These expenditures are exclusive of labor costs.

Wood Preservation

A MEETING of the committee on wood preservation of the Engineering Association was held at Association Headquarters, New York, on Jan. 20. Those present were A. P. Way, chairman; M. J. Curtin, J. L. Fritsch, W. L. Harwood, C. A. Smith, L. P. Scanlan and R. C. Cram, sponsor.

The work of the committee for the ensuing year was laid out. The assignments of the various sub-committees and their membership follow, the first name in each case being that of the chairman:

1. Review of existing standards. Messrs. Fulweiler, Hartman and Woods.

2. Open tank treatment of wood poles. Messrs. Fritsch, Hartman, Harwood, Morier and Scanlan.

3. Brush treatment of wood poles. Messrs. Hartman, Harwood, Smith and Woods.

4. Pressure treatment for wood poles. Messrs. Curtin, Fritsch, Woods and Scanlan.

5. Increasing life by methods other than the use of timber preservatives. Messrs. Harwood, Fritsch, Hartman and Scanlan.

6. Use of other preservatives than creosote. Messrs. Smith, Curtin, Fulweiler and Morier.

7. Forms and methods for keeping continuous records on performance of treated timber. Messrs. Morier, Curtin, Fulweiler and Smith.

Maintenance of Equipment

Motorized Equipment Reduces Track Maintenance Costs

Welders and Compressors Mounted on Rebuilt Ford Trucks Are Readily Moved Between Jobs—Rubber-Tired Mounting Reduces the Repairs to Apparatus

FOR the purpose of increasing the mobility of track equipment and at the same time reducing its maintenance cost the Denver Tramway has adopted the practice of mounting such apparatus on 1-ton Ford trucks. Each of these units is self-contained and no trailers are hauled. The equipment is run into the shop at night, where it is under cover and easily fixed when repairs are necessary.

It has been found possible to buy second-hand Ford trucks in fairly good shape at exceptionally low prices. With very little overhauling these trucks are put into condition which makes them suitable for track maintenance work. The average price of trucks thus purchased was approximately $85.

The welding truck, shown in an accompanying illustration, is a good example of this type of equipment. It carries a crew of three men and has two welding heads. A light body is used to house the equipment, having substantial corner posts and a permanent top. Rolled curtains on the sides protect the equipment in inclement weather. The welding cables are carried on reels mounted under the top, so that they readily may be paid out to considerable distances on the track. Signs directing traffic and warning passers-by to avoid watching the arc, as well as shields to set up around the actual welding work, are carried in convenient racks built over the running board at one side of the body. On the opposite side a pair of brackets is arranged to carry the poles for connecting the welder to the trolley.

This equipment is used for welding bonds and also for building up cupped joints. On the latter class of work an Atlas grinder is used to smooth off the surface of the rail after welding.

Formerly six men were required in a repair crew because ordinarily one grinder can do the work after two welders. By using two heads on this welding equipment as mounted in the truck, four men do the work formerly requiring six. This crew consists of one grinder, two welders and one common helper. The grinder is hauled out with the welding truck, thus making the most efficient use of the equipment.

A similar piece of track maintenance equipment mounted on a Ford truck is shown in a second illustration. This consists of an Ingersoll-Rand type 14 compressor, which has sufficient capacity to handle four tie tampers or four concrete breakers at one time. In joint repair or similar maintenance work it has been found extremely convenient and, like the welding equipment, its mobility is a decided advantage.

As shown in the illustration, the body for this compressor truck is provided with removable metal sides so that when set up in operation these sides may be removed to expose the compressor for oiling or other operating attention. The compressor is motor driven from the trolley. Compressed air tanks are mounted vertically near the back of the body, and a circuit breaker for protection of the motor is installed in a small control cabinet at one side of the tank. A large tool box is mounted on an extension of the chassis at the rear.

For concrete repair work, a portable boiler is used to furnish warm water. This is required for a large part of the work in Denver, since the nights are cold. The boiler is mounted on a trailer so that it may be hauled out to the job behind one of the Ford trucks just described.

Railway Builds Heavy Tower Truck

TO TAKE care of heavy overhead construction work the Middlesex & Boston Street Railway, Newtonville, Mass., purchased a 2-ton White truck and built a body and tower on this

A Motor-Driven Compressor Mounted on a Ford Truck Chassis Will Handle Four Tie Tampers or Concrete Breakers

A Crew of Four Men with This Portable Welding Outfit Can Do the Work of Six

A Permanently Inclosed Body Is a Feature of This Heavy Tower Truck

chassis. The work was done at the Waltham shops of the railway. The body is of oak, while the sheathing on the sides and top is pine covered with canvas. This tower truck is similar in general design to one built some time ago by the same company, and described in ELECTRIC RAILWAY JOURNAL for Aug. 12. The new vehicle, however, is heavier and better adapted for doing work where extensive reconstruction of the overhead is involved. The crew consists of six men, a foreman, a driver, and four linemen.

Poles Set with A-Frame Derrick

AN A-FRAME derrick attached to an extension of the truck frame of a standard tower truck for setting iron and wooden poles has been used during the past 4 years by the Omaha & Council Bluffs Street Railway, Omaha, Neb. A 2½-ton Gary truck with power take-off is used. When raised, the sheave is about 15 ft. above the ground. Power is transmitted through a set of gearing with three speeds ahead and one reverse. This transmission drives a 5,000-lb. Bay City winch, which is located back of the tower. A length of 600 ft. of ½-in. hoisting cable is used for the winch. The cable is carried from the winch up over the sheave on the A-frame and then to the pole to be raised. One man operates the control levers and another steers the pole into the hole. When not in use, this A-frame is removed from the truck by taking out two bolts. When 35-ft. poles are to be set, an additional 5-ft. piece is added between the truck and the bottom of the short A-frame.

With this addition to the company's standard line truck, the cost of setting poles has been cut to half and the cost for removing iron poles to about one-fourth of the former cost where a gin pole was used. An additional saving has also resulted when removing iron poles by lifting out the concrete base intact without loosening it from the iron pole. The pole is then ready to be set in another location without much work. The poles to be set are hauled on a 2½-ton trailer behind the line truck. The trailer is uncoupled when the job is reached.

Motorman's Valve Worked In by Machine

BY O. R. HOTT
Columbus Railway, Power & Light Company, Columbus, Ohio

A MOTORMAN often complains that a recently overhauled air valve works hard, due to the newness of the seat and the close fit of the valve stem. To work in new valves an apparatus is used in the car repair shops of the Columbus Railway, Power & Light Company. This operation duplicates the wearing-in process which would require several days actual use by a motorman.

As shown in the illustration, a ¼-hp., 500-volt d.c. motor drives, through worm gearing, a crank which in turn operates the valve. After the valve has been lapped in by hand, it is assembled on a valve support on the bench and connected to the shop air line in the same manner as on the car. The special motorman's valve handle used has a connecting rod, the other end of which is fastened to a crank pin of the propelling mechanism. Both ends of the connecting rod have ball and socket joints. The stroke of the connecting rod is such that the valve is oscillated back and forth 120 times per minute through the usual operating arc. Working in a valve takes from 15 to 30 minutes, depending upon its tightness at the start.

This entire outfit was made in the shops from materials at hand. The reduction gearing and crank were designed and built in the shop, while the connecting rod is a portion of a

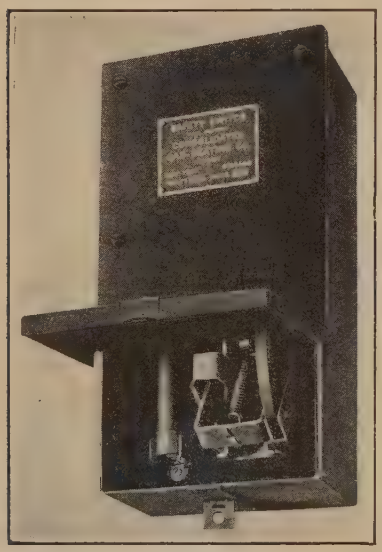
An Apparatus Which Gives the Motorman's Valve the Proper Freedom of Movement Before It Leaves the Shop

Ford automobile steering gear. Since this mechanism has been used motormen have experienced no trouble from sticking valves.

New Equipment Available

Safety Switch

SEVERAL improvements have been made in a design of safety switch manufactured by the Consolidated Car Heating Company, Albany, N. Y. The switch box is arranged to contain the fuse for car heater circuits. By opening the cover the switch is automatically opened so that there is no danger of a person touching live parts while replacing a fuse. The switch is mounted in a steel box 6 in. x 12 in. x 4 in. deep. The lower part of the cover is hinged so as to provide for replacement of fuses. For ordinary operations of opening and closing the switch an arm projects through the cover and the two positions are lettered so as to indicate "On" and "Off." Opening the cover automatically shifts the handle to the off position, so that a fuse cannot be removed with current on.



Safety Switch for Car Heater Circuits. The Cover Is Shown Raised to Permit Fuse Replacement

Improvements in construction include contacts mounted in molded insulation and an arc chute with blow-out coil. The contact tips can be replaced and screws can be taken out from the front.

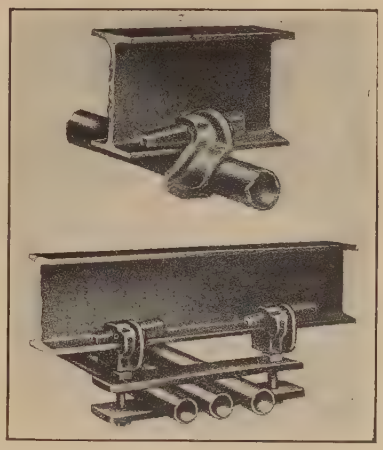
Copper Bearing Steel Poles

OF THE substitutes for wood poles which have been tried, those made of steel have many advantages and no doubt would have superseded wood but for their high first cost, when compared with wood, and lack of dependability due to danger of damage by corrosion. Up to the present, galvanizing has been the only method tried to prevent corrosion, but this adds greatly to the cost. Recently the Truscon Steel Company, Youngstown, Ohio, put on the market a steel pole fabricated from copper-bearing steel which contains new features in design tending greatly to reduce manufacturing costs.

The mechanical construction of the pole was described in the June 21, 1924, issue of ELECTRIC RAILWAY JOURNAL. It consists of two structural steel channels, each with the center portion of the web sheared and pressed out normal to the web. The pressed out sections have a triangular shape and when riveted together a latticed tapered pole is formed.

Hangers for Clamping Pipes to Framework

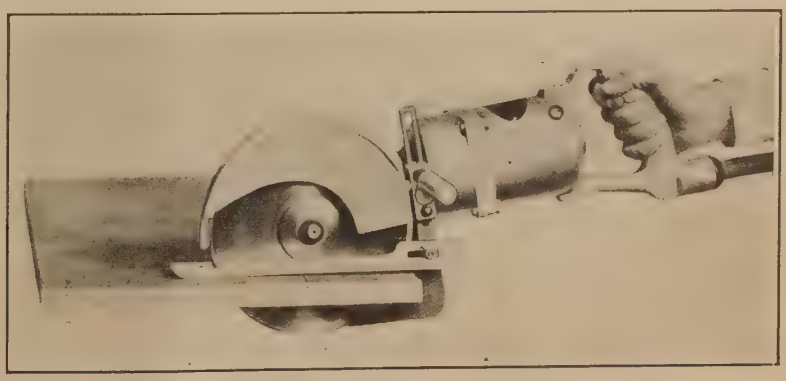
A LINE of pipe hangers for clamping conduit or pipe to structural shapes is being marketed under the trade name of "Wedgtipe" by the Crouse-Hinds Company, Syracuse, N. Y. These pipe hangers allow pipe or conduit to be clamped to supporting members where the flange is not less than $\frac{1}{8}$ in. at the edge and not more than $\frac{3}{8}$ in. thick at a distance $\frac{3}{4}$ in. from the edge. They are particularly convenient for fastening conduit to the underframing of car bodies. Each hanger consists of two pieces, a hook and a wedge. The hook fastens underneath the pipe or conduit and the wedge provides the clamping action when driven into place. The wedge has serrated surfaces at both top and bottom, so that when driven into position, there is no danger of its working loose through vibration.



New Hangers Used to Clamp Single Pipe to I-Beam and Also Several Pipes by Means of Cleats

Electric Circular Saw

A PORTABLE type circular saw which is electrically driven is being marketed by the Michel Electric Hand Saw Company, Chicago, Ill., under the trade name of "Skilsaw." This can be used for cutting lumber up to 2 in. thickness. By means of a special cutter furnished with the saw other building materials can be cut. The body of the saw is made of No. 12 sheet aluminum, so as to keep down the weight of the tool. The electric motor for driving the saw is of the universal type and can be furnished in sizes for use on either 110 or 220 volts, a.c. or d.c. The motor is air cooled by forced ventilation. The control is by a contact trigger switch on which the operator's finger must be held to keep the motor running.



Cutting a Board with the Portable Electric Circular Saw

The News of the Industry

Chicago Bankers Insistent

If Municipalization Scheme Is to Go Through, Security Holders Must Be Accorded Protection

A new tone of militancy has entered the Chicago traction negotiations. With all parties in the municipalization program holding in steam nearly to the bursting point, something like an explosion seemed imminent. The tenseness was created by the statement of Silas Strawn, attorney for the bankers holding Chicago Surface Lines securities, that the city could not get control of the lines until the last cent had been paid. An election in February impends.

"Do you mean to say that when we have paid in 90 per cent we will still have 30 per cent control?" shouted an Alderman when Mr. Strawn made known the bankers' insistence on those terms.

"Not if you had anything but stage money to pay us," retorted Mr. Strawn ironically.

"We won't stand for it," broke in Chairman U. S. Schwartz, who conducts most of the city's negotiations. "We'll kill the whole deal."

This was only one of several stormy incidents, but it was the major development of the negotiations of the city of Chicago to create a city-owned transportation system to cost upward of $500,000,000. The upshot was that Mayor Dever backed up Mr. Schwartz and issued a veiled threat to the Surface Lines securities holders.

"The bankers are mistaken if they think the city powerless," said the Mayor. "And if they think that because we are on top of the elections we haven't another program for just this contingency, they are due for some information.

"They can take this as an ultimatum: co-operate or we will step out with another plan at once. The air has been cleared and I am not discouraged. If they want a settlement they can have it, but they will have to come to us now."

The contested section is one providing for tripartite control of the lines until the city pays off all the so-called Schwartz certificates, which are the notes to which Mr. Strawn referred as "stage money." The city will have outright dictation over three of the nine members of the operating board and it has been the intention of Mayor Dever's advisers to have him take over the appointment of additional members in proportion to the amount of indebtedness paid off.

Committee members then asked Mr. Strawn to try another plan on the bankers.

"I am not smart enough to devise a substitute," he said in reply. "The bankers feel that their obligation to the last certificate holder is as great as to the first one paid off. They will not recede."

A poll of the committee on the question of acquisition of control in proportion to retirement of the city's notes brought a dissent from Alderman Guy Guernsey, one of the foremost members of Council. Pressed for a reason, he retorted:

"I care too much for this plant to let a Council run it. I am concerned about our transportation not so much during the period of payment while private traction men have control as for the ten years that follow."

Alderman Fick, calling the traction plan a 50-year franchise for the Surface Lines, recalled the day when he entered the chamber to vote on a Yerkes 50-year franchise.

"Nooses dangled from the gallery and there were bombs on the floor," he said. "The franchise got 12 or 13 votes."

Divided Report on Boston Elevated

Wide Conflict of Opinion Among Members of Special Legislative Committee—Bare Majority Seeks Delay—Minority Would Extend Public Control Twenty Years—Battle in the Legislature Expected

TWO separate and distinct reports were filed on Jan. 17 with the Legislature of Massachusetts by the joint special committee of that body created to investigate the question of control, finances and equipment of the Boston Elevated Railway and to consider and report on the advisability of establishing a transportation district for the financing of metropolitan rapid transit. The membership is widely divided on questions of policy and in its conclusions. There is a majority report signed by five out of the nine members, headed by House Chairman Henry L. Shattuck, and a minority report signed by four other members, headed by Senate Chairman Charles C. Warren.

At the outset of the committee's investigation the public trustees of the Elevated presented a statement of capital needs calling for an expenditure of approximately $20,000,000 in the next 10 years, at the same time calling attention to the company's inability to provide the necessary capital without Legislative aid.

The majority in their conclusions state that the several questions presented in the order creating the committee are so interrelated that new capital should wait upon a further study of the termination or extension of public control, complete public ownership and the question of the creation of a transportation district. The majority state that while they are aware that many of the improvements which the Elevated desires are desirable and should be made in the near future, raising new capital for the purpose of making these improvements is so involved with the other questions that further study should be made of the whole problem; and a resolve is submitted providing for a further investigation.

The minority are in accord with the majority in its recommendation for a further study of the formation of a metropolitan transportation district, but is opposed to the remainder of the conclusions and recommends that the present General Court extend public control for 20 years. An extension of public control for this period, they believe, will be ample to allow the Elevated to finance itself. They take the position that the road must not be hampered nor obstructed in its progress and operation. New capital is needed and should be provided without delay. The greatest obstacle in the way of the company's obtaining new capital is the uncertainty as to the future, and the minority recommend the 20-year extension, confidently believing that it will furnish the necessary relief. They also present a bill providing for an extension of public control for the period mentioned.

In brief, the majority committee has concluded that there are a number of desirable improvements for which capital should be available within the not remote future. The method by which such needed capital is to be raised, if a far-sighted plan is to be adopted, involves at one and the same time the questions of termination, modification or extension of public control, of complete public ownership or further steps toward public ownership, and of the creation of a transportation district.

These questions, the majority committee says, are interrelated and inseparable. They involve problems of great complexity and of the highest statecraft. No decision concerning public control should be made without the fullest examination, from every angle, of complete public ownership and of further steps toward public ownership; and no decision on either public control or public ownership should be made without the most careful consideration of the need for a transportation district and of the powers, duties and political structure and control of such district if created. The committee believes that it would be most unwise to attempt to pass on any one of the questions without the fullest study and

consideration of all. The majority of the committee said in part:

If the fixed term of public control is extended, various amendments to the public control act should be made, and if a transportation district is established to take over the control of the Elevated system and provide for the ownership, construction and financing of rapid transit lines, the public control act must be so revised as to make it fit the district plan. In carrying out any such changes, and in the financing of any capital expenditures which may be required, the stockholders of the Elevated should give their hearty cooperation.

No plans for raising capital in any considerable amount on satisfactory terms pending further study of these questions as a whole have been suggested to the committee except such as might greatly hamper, if not hamstring, a wise, long-range solution of these questions. The committee, therefore, looks with disfavor on the adoption of any palliative which in no way strikes at the root of the difficulty.

The proposal that the fixed term of public control be extended for 20 years, if adopted, would give no assurance that new capital could be raised through the sale of Elevated stock.

PUBLIC CONTROL CONTINUES

The principal advantage, so far as the public is concerned, of extending the fixed term of public control beyond 1928 is to enable the company to raise new capital at reasonable rates.

If this object is not attained, the principal argument for an extension of the fixed term fails. Before making any extension of this fixed term we should be very sure that such extension will make possible the accomplishment of this object. As previously stated, there is no such assurance.

Furthermore, if the 20-year extension were granted and the question of establishing a metropolitan transportation district were postponed, it might be much more difficult, if not impossible, to obtain the required assent of the Elevated stockholders to such changes in the public control act as might prove advisable in connection with the establishment of the district.

Another objection to rushing into any extension of public control is that certain plans have been submitted to the committee for financing capital needs without any extension of public control. These plans should be further studied before any final commitment is made on this question.

RECOMMENDS FURTHER STUDY

For the reasons stated above, the only recommendation which the committee makes at this time is that these questions of public control, public ownership and transportation district be further studied.

The committee believes that no vital public needs will be imperiled by the delay caused by further study.

More important at the moment than new capital is the balancing of the budget. That must come before any considerable capital expenditure can be thought of.

As previously pointed out, there has been a great change since July, 1923. Then receipts were running at the rate of more than $1,000,000 a year above expenses, and the margin of receipts over expenditures was increasing.

In October, 1923, came a wage award which increased annual expenses by about $1,800,000, and the year ended June 30, 1924, closed with an operating deficit of $144,202, which was wiped out only by a fortunate settlement of old claims. Since then every month from July to October has shown a deficit, and in October, 1924, came another wage award, increasing the annual wage expense by about $500,000 more.

Following this, the 5-cent fare went by the board. No one knows now whether fares must be increased to meet expenses. No one knows whether wages will be lower or higher this year. Much depends upon the wage settlement to be made for the year beginning July 1, 1925. The committee repeats that the question of revenue and expense is the question of the hour. Further capital expenditures must and can wait.

The minority of the committee agrees with the majority in its recommendation for a further study of the formation of a transportation district, but opposes the remainder of the conclusions. It undertakes as briefly as possible to set out its reasons why it believes it is necessary that the questions of continuance or discontinuance of public control, the needs of the road for additions and improvements, and the financing of the same, are subjects that should be presented to this session of the General Court for discussion and debate, and an opportunity be then given to remove the uncertainty that surrounds the future of the company. The minority report said in part:

When the trustees came before the committee at the first public hearing and presented a statement of their requirements, they filed with it a schedule of plant improvements, the construction of which was to cover a period of 10 years and was estimated to cost $20,000,000.

Whether every item listed in said schedule is imperative we do not undertake to say, but from our investigation of the plant made by visiting and examining places where improvements were contemplated, it was obvious that many are needed, and that some should be made in the near future in the interest of economy of operation.

The law puts restrictions on the sale of Elevated stock. It does not allow the issue of that stock at less than par, and the common stock of the company, under present conditions, has lately been selling in the market around 76 and the 7 per cent preferred at 94, so it is clear that raising capital by this method is out of the question. It does not seem advisable for the trustees to issue stock bearing 8 per cent dividends, as they have authority to do, as this would place an unfair burden on the car rider.

Under the present law the trustees may issue notes that are made payable not more than 12 months from date of issue, but special legislation would be necessary to enable them to issue notes for a longer period. The trustees have already borrowed on short time notes the sum of $5,200,000, and believe they have approached the limit with notes of this character; to borrow further on short-time securities would, in their opinion, seriously affect the general credit of the company. As obtaining capital by the sale of stock is impossible, and an issue of bonds or short-time notes inadvisable, how, then, are the trustees to get capital to the amount recommended?

PUBLIC CONTROL A SUCCESS

Public control has been in operation sufficiently long to impress the public with its practical success. Those who appeared and spoke at the public hearings of the committee were practically unanimous in recommending a continuance of public management. All were agreed that the affairs of the road had been administered by the public trustees in an economical and business-like manner. Its efficiency has been restored, and satisfaction with the service rendered prevails to a greater extent today than for some time past.

With the possible end of public control so near and that fact well known and recognized, uncertainty prevails. This is having a marked effect upon the development and expansion of the company. The price of the common stock on the market is a strong reminder of the present situation and a true indication of how uncertainty will affect the standing of a large corporation.

The trustees are fully alive to this state of affairs and have convinced us of the necessity of removing as soon as possible this state of doubt, so that the credit of the company will not continue to be adversely affected.

We, therefore, recommend that the act be extended for a further period of 20 years, together with amendments that are advisable, and submit an act. We believe an extension for that period will provide such assurance as to the future of the road as will enable it to finance itself. Such an extension will also afford reasonable permanency and permit broad plans for development over a period of years.

We further point out in support of our position that the trustees have already been delayed over one session of the Legislature, having first presented their needs at the session of 1924, and if they are now compelled to wait further study and a report upon all the questions in the order, any action in their behalf will be delayed until the session of 1926.

It is not at all clear that if the formation of a transportation district is further studied and recommended that it will ever be established. It may appear that the towns and cities adjacent to Boston are not yet ready to become united in a plan of this kind. The fact that a metropolitan transportation district may be established at some future time does not justify delaying action as to the extension of public control. In any event, with the future so uncertain as to a district and the needs of the Elevated so apparent, further delay would be a mistake. The public control act directs the trustees to maintain the property "in good operating condition and to make such provision for depreciation, obsolescence and rehabilitation that upon the expiration of the period of public management and operation the property shall be in good operating condition.

We therefore reiterate that improvements should be permitted and capital provided, and that this Legislature at the present session should extend such assistance to the road as will enable the trustees to maintain the railway in such operating condition that it can render efficient service to the public at a minimum cost.

Injunction to Stop New York City's Bus Program

The Board of Estimate of New York on Jan. 19 appropriated $135,000 for buses with which to equip a city-operated line on Eighty-sixth Street. Twenty buses were to be purchased. Commissoner Mills of the Department of Plant and Structures anticipated a profit of $100,000 a year. The line was to be established on the assumption that Comptroller Craig is right in saying that the city has power to operate buses under the home rule amendment passed by the Legislature at its last session. This assumption was challenged a few hours after the appropriation had been made by Leonard M. Wallstein, acting for the Citizens' Union. He secured a temporary injunction against the disbursement of the $135,000. It has been Mayor Hylan's contention that additional legislation was needed for the city to enter upon its own bus program, but Mr. Craig has stuck stoutly to the contention that the city already had powers sufficient to permit it to proceed. The Mayor finally capitulated.

Dallas in Throes of Fare Difficulties

The City Commission of Dallas, Tex., recently granted the Dallas Railway a second extension of the 6-cent fare for 30 days ending Feb. 10. The first extension was granted Dec. 27 for 15 days. In line with the 6-cent fare extension the company will be expected to carry out improvements suggested in the amended Everman Plan No. 3, soon to be drafted by the city attorney. The plan provides for $243,000 in betterments to the system in return for being permitted to charge a 6-cent fare for another 18 months. The amendment includes the rebuilding of 25 cars. At the same time Supervisor Everman has left the way open to negotiations eventually to remove the time limit on the 6-cent fare.

A spokesman for the City Commission explained that this would be done by an alteration in the phraseology in the ordinance giving legal effect to Everman Plan No. 3. It reads: "At the conclusion of 18 months the fare will automatically revert to 5 cents." The alteration will be to this effect: "At the conclusion of 18 months the fare will continue at 6 cents unless otherwise ordered by the City Commission."

It was said that this proposed change would place the Dallas Railway in position to borrow or float bonds to the sum of $1,000,000 of new money to be placed in the properties.

This development, however, can not take place unless the State Supreme

Court at Austin decides the Geller suit favorably toward the traction company and the city. This suit, filed by F. J. Geller of Dallas, questions the right of the City Commission to grant a 6-cent fare when the franchises of 1917 specify 5 cents. Until this suit is adjudged, the traction company is not in a position to borrow money, officials testified at the public hearings.

Under the terms of the franchises when the reserves are refilled, the $900,000 of improvements made in the past under Everman Plans Nos. 1 and 2 will be added to the property value of the company. At present the company is permitted to earn 7 per cent on a property value of $9,500,000. With the improvements admitted to property value the company will be permitted to earn 7 per cent on $10,400,000. It was brought out in the hearings that the gross revenues of the company have remained the same for the last 3 years in spite of the improvements. It is not estimated that they will increase next year. On that basis it is feared that with more money going to pay the authorized return less money will be in the surplus for improvements.

Talk of Railway Buses at Worcester

Whether or not the Worcester Consolidated Street Railway, Worcester, Mass., operates buses in the near future is reported to depend largely upon what the 1925 Massachusetts Legislature does regarding the enactment of laws intended to control the use of these vehicles. Officials of the railway are said to believe that in some of the outlying sections which the railway covers the buses could be operated more economically than trolley cars. The present laws do not cover certain points regarding transportation by bus which the Consolidated officials want to see cleared up before they consider the operation of buses.

Charter Sought for Subsidiary Bus Company in Pittsburgh

Application has been made for a charter for the Pittsburgh Motor Coach Company, which will be affiliated with the Pittsburgh Railways, or more properly the Philadelphia Company. The proposed incorporation of the new company is regarded as the first steps toward establishing a network of bus lines in Pittsburgh and other parts of Allegheny County.

In the charter application, two proposed routes are specified. One of the routes proposed is the so-called Squirrel Hill route, along the Boulevard of the Allies, through Squirrel Hill and to Thomas boulevard in Homewood. The other is the route from Butler and Fortieth Streets across the Washington Crossing bridge to Millvale.

After the initial routes are established, the present plans include the gradual extension of route establishments until those points in the city and suburbs not covered by street cars are furnished transportation. Activities outside of Allegheny County, in which Pittsburgh is located, are not likely to be projected for some time to come.

What Would You Do?

WEATHER like that of Friday and Saturday is enough to try the patience of most folk, and nowhere more than on the street cars can there be found evidences of the varying reaction upon the human animal of the delays and inconveniences to transit. "Rotten service" is perhaps the first and most natural verdict of the average man or woman who stands in the slush waiting for the car that does not come or, worse yet, stands in impotent rage when it runs past without stopping. And the same conclusion is often reached by the more fortunate one who, once inside the car of his choice, is compelled to stand in a space far too small and await seemingly indefinite hours while stalled automobiles and trucks are dug out of the drifts.

It is not wonderful that patience breaks under the strain, but it is peculiarly a time for philosophical endurance and for that give-and-take without which intercourse with our kind would often be intolerable. Car conductors and motormen are only human, and if they sometimes lose their tempers, if they run by when they ought to stop, if the side door is closed to waiting and shivering folk on the corners and if the trip to business or home again takes two or three times the normal period, it is unfair to put all the blame on "the service." Impolite or tactless carmen can be admonished or disciplined, but the weather we have to take as it comes. And the narrow streets and their increasing use by wheeled vehicles cannot be remedied or checked by cussing at them or at the transit company. If the fellow who damns the "rotten service" would only consider what he would do on days like Friday or Saturday to make it better, perhaps he would realize that there are limits beyond which executive management cannot hope to go and that rain and snow and ice, like time and tide, wait for no man.

Editorial from Philadelphia *Public Ledger*, Jan. 5, 1925.

Seeks Amendment of Syracuse Franchise

The New York State Railways, seeking to abandon its railway line in Grape Street and establish bus service in its place, is to ask amendment to its franchise covering the route. The move is sought by the city in an effort to relieve congestion in the downtown section of the city. The company has never before sought to replace trolleys with buses. The bus routes have all been in sections where the railway did not hold franchises. These lines are operated under special bus permits.

The company fears that if it established buses on the Grape Street line under permit the provisions of its franchise would become void. It wishes to hold the franchise for the streets traversed and at the same time operate buses.

Alabama Decision Protects Railways

The Alabama Public Service Commission has ordered a number of jitney operators at Huntsville and Gadsden, Ala., to discontinue service until they have complied with state regulations. By this ruling the state commission lays down a precedent that railway service must be protected. The commission held that jitneys are a public utility and as such are subject to the rulings of the commission. It was the opinion of the commission, however, that cities having utilities should adopt their own jitney regulations. The action of Birmingham in forbidding the use of jitneys was cited as an example of the success of city regulation.

Hopes of Service Resumption Blasted in Marietta

All hopes of an immediate resumption of railway service between Marietta and Atlanta, Ga., were blasted on Jan. 16. That day, after an agreement had been reached between the officials of the Georgia Railway & Power Company and a group of Marietta citizens that the service should be resumed Jan. 17 and the City Council of Marietta had passed an ordinance forbidding the operation of jitneys on its streets, Judge Morris of Marietta, representing a number of bus lines, filed suit in the Fulton Superior Court asking a receivership for the railway. Filing of the suit caused railway officials to abandon the agreement reached at the conference and wrecked all hopes of an immediate resumption of service.

The petition filed by Judge Morris seeks the following things:

That any and all patrons of the said road who may so desire be permitted by order of this court to intervene and be made parties to this cause.

That the defendant, its agents and employees be enjoined from at any time in the future disconnecting or dismantling any of the tracks, electric lines or other properties of the said defendant which are necessary for the operation of the road.

That a temporary receiver or receivers be appointed instantly by this honorable court, with direction and authority immediately to begin the operation of the said road as it was operated up until Jan. 14, 1925; that the defendant, its officers, agents and employees be ordered and directed to turn over and deliver to said receiver all of the physical properties of the Atlanta Northern Railway, and that the conductors, motormen, agents and other employees of the company who were engaged in the operation of said cars immediately prior to the time the defendant ceased the operation of the same be ordered and directed by this honorable court to operate the said cars under the direction of the receivers appointed by the court.

That on the final hearing of this cause the said receivership be made permanent unless the defendant, through its properly constituted officers, agree to continue the operation of the said railroad in the manner in which it was being operated prior to the time it ceased operations or until it, in the manner prescribed by the laws of the state, be duly authorized to cease the operations.

That on the final hearing of the cause the defendant, its officers, agents and employees be permanently enjoined and restrained from at any time in the future, in any manner, dismantling or disconnecting any of the physical properties of the said railroad or ceasing the operation thereof until authorized to do so in the manner prescribed by the laws of the state.

That the petitioner have such and further relief as the court may deem right and proper in the premises.

New Co-ordination Scheme to Meet Financial Emergency

An electric railway that was profitable three months of the year and unprofitable the other nine months has turned the bus to its advantage. About 6 months ago the Newport Electric Corporation, Newport, R. I., operating the road in question, made plans to supplant the railway service nine months of the year with buses and to operate both the electric railway and the buses during the three summer months in order to take care of the peak business. In other words, the electric railway service with the shops, etc., would be closed down approximately nine months of the year or until the congestion of the highways should bring about the use of the electric railway.

In order to do this the company secured a certificate of necessity and convenience from the Public Utilities Commission of Rhode Island. Before the railway could secure delivery of its buses, however, an independent operator established service. The Newport Electric Corporation secured an injunction and stopped this service. It is now giving the service itself. The court proceedings of this case were used as a basis for similar action on the part of the New York, New Haven & Hartford Railroad and the Boston & Maine Railroad in their efforts to restrain the operation of bus services which they regard as particularly unfair. As indicated previously in the ELECTRIC RAILWAY JOURNAL preliminary injunctions restraining seven bus lines from continuing operations have been granted by Judge Chester W. Barrows in the Superior Court at Providence on petition of the United Electric Railways and the New York, New Haven & Hartford Railroad. The case of the New Haven road against the Interstate Buses Corporation has been removed to the United States District Court.

The electric railway department of the Newport Electric Corporation consists of 22.39 miles of track, using 62 cars, in the city of Newport and the towns of Middletown, Portsmouth and Tiverton, and an interurban line from Newport to Fall River, Mass.

Duplication of Service Voted Down in New York

The Public Service Commission on Jan. 5 denied the application of the Bee Line, Inc., for permission to operate a bus line from the New York City line at Rosedale to the village of Freeport. The petition was opposed by the receivers of the New York & Long Island Traction Company, who produced figures in evidence showing that during 10 days of operation of the bus line in August and September there was a considerable falling off in receipts of the railroad. The investment of the New York & Long Island Traction Company from Freeport to Jamaica Junction was testified to be at least $300,000, and the company is now in position to continue operations and effect betterments out of its income if not deprived of operating revenue. A reorganization of the company for further financing and betterments is expected to take place shortly. The commission concludes that if the road and its receivers and the reorganized company do not give proper service a new application for a bus certificate may be proper.

Boston "L" Can Discharge Citizens from Employ

Trustees of the Boston Elevated Railway, Boston, Mass., have the right to discharge employees who are citizens or World War veterans and retain noncitizens. An opinion to this effect has been rendered to the Governor of Massachusetts by Attorney-General Jay R. Benton. The question was put up to the state authorities by Leo M. Harlow, commander of the Massachusetts department of the American Legion. He declared that the Elevated, under its seniority of service rule, was laying off employees who were World War veterans and keeping men who were not citizens. In view of the fact that the Elevated is under public control, Mr. Harlow questioned the right of the trustees to deprive the World War employees of the preference right given similar employees in other branches of the public service. Mr. Benton holds that "the service in which the employees of the company are engaged is not in any branch of the public service and that the statutory provisions giving preference to citizens and veterans in the public service are not appreciable."

Carol, Sweetly Carol

Clinton D. Smith, general manager, and H. O. Allison, commercial manager of the Beaver Valley Traction Company, New Brighton, Pa., promoted the revival of the singing of carols Christmas Eve last year throughout the district of thirteen towns and townships in which the lines are operated. Obtaining the services of Prof. T. Earle Yearsley and Prof. J. Christian Ringwald, Beaver College, the carol singers, numbering 200, were rehearsed, divided into groups and assigned to districts prior to Christmas Eve. After the separate groups had visited a large number of homes where there were "shut-ins" they were assembled into one group and sang at the various hospitals and institutions. Transportation was by street car and by motor coaches, obtained from the Beaver Valley Motor Coach Company, a subsidiary of the traction company.

Recommend 112 Miles of Railway Construction in Maine

An investigating committee recently recommended to the Interstate Commerce Commission the construction of 112 miles of electric railroad in Aroostook County, Maine. The new line, which will be known as the Quebec Extension Railway, will develop Maine's timber region east of the Rocky Mountains, consisting of 1,200,000 acres of virgin timber in northern Maine. The Quebec Extension Railway is controlled by the Aroostook Valley Railroad, which has been in successful operation about 15 years. The cost of the project is estimated at $4,000,000.

Illinois Central Seeks Increase in Commutation Rates

The commutation lines of the Illinois Central Railroad, now in the midst of a $26,000,000 electrification program, and three other big railroads spreading fanwise out of the heart of Chicago have taken steps to increase commutation fares 20 per cent, effective as soon as permission can be obtained from the state. The change will affect more than 150,000 passenger trips a day.

The Illinois Central operates 402 suburban trains and carries 87,000 passengers a day. It announces a deficit of $3,824,116 in 4 years on suburban service without adding any return on property investment and says it could save $1,000 a day in running expense alone by stopping all its suburban service. The income in the 4 years was about $10,000,000.

Electrification has already cost $12,000,000. This sum includes $4,000,000 already paid out and $8,000,000 of obligations entered into in the last 60 days for equipment. With the electrification will also be completed a park project, so that the Illinois Central will run its first 8 miles virtually all through lake front parkway, lagoons, golf courses and bathing beaches.

The change in rates is expected to have a profound effect on part of the city's transportation, as all the lines have heavily populated zones in direct competition with elevated, bus and street car lines. The present Illinois Central 10-ride ticket fare to competitive stations is 11 cents a ride, the elevated 10 cents cash or three tickets for 25 cents, bus 10 cents and surface lines 7 cents. The railroad, however, makes the run in half the time. The Northwestern's 10-ride rate to competing territory is 11 to 19 cents a trip, the latter being the fare to Evanston. The road has 184 daily trains carrying 33,000 passengers. The other lines seeking the increase are the Burlington, with 185 trains daily, and the Rock Island.

Bus Legislation Suggested in Wisconsin

Agitation has been revived to tax bus lines in Wisconsin 3 per cent on their gross earnings, as a contribution to the state highway fund. It is estimated this tax would produce more than $1,000,000 annually. An effort is also expected to be made at the present session of the Legislature to bring the bus lines under the supervision of the Railroad Commission with respect to service, routes and fares.

Home Rule Agitation Renewed

Suggestions have been made in Minnesota to have the Legislature of 1925 restore to the individual cities control of street car fares and regulation. In 1923 the Legislature authorized the Railroad and Warehouse Commission to regulate fares in St. Paul, Minneapolis and Duluth. Valuation hearings proceeded throughout the 2 years with only one decision, that in the Duluth case. St. Paul and Minneapolis evidence is now in the hands of the state commission. The Duluth order was annulled by a federal court ruling.

License Board Refuses Bus Permit to Boston & Worcester

The Worcester, Mass., license board has refused to grant the Boston & Worcester Street Railway permission to operate buses in Worcester as a part of the Boston-Worcester bus line. During the hearing it was made to appear unlikely that a satisfactory arrangement could be made with the Worcester Consolidated Street Railway for the transfer of passengers from buses to the trolleys at the city line.

The plans of the company as explained to the license board involved the operation of four 25-passenger buses on 2½-hour schedules. The proposed fare between Boston and Worcester was set at $2. Two subdivisions of the fare were contemplated, however, one a $1.25 fare to Marlboro from either terminal. Consolidated officials took the attitude that if the time had come for operation of buses it should receive the preference.

The Boston & Worcester representatives explained it wanted the buses even though it continued to maintain its Boston to Worcester trolley, to get back patrons lost to bus lines operating between the two cities.

The Boston & Albany Railroad was also placed on record against the petition. It was explained that this was not because of any feeling against the Boston & Worcester, but because the road felt there were adequate means of transportation between the two cities. The New York, New Haven & Hartford Railroad also went on record against the petition.

Mayor Michael J. O'Hara supported the stand taken by the license board.

Wants 7 Cents in Shreveport

The Shreveport Railways filed a petition with the Louisiana Public Service Commission on Jan. 14 requesting that body to permit an advance in rates from 6 to 7 cents per adult passenger. The fare for school children would remain at 2½ cents. The petition points out that the present fare of 6 cents was fixed by order of the Public Service Commission with the stipulation that certain improvements be made. These improvements were made, the petition asserts, at a cost of $210,457. It is further declared that while the company is permitted to earn 8 per cent, during the period of Jan. 1, 1924, to Oct. 31, 1924, the company earned only $17,122, whereas it should have earned $116,667. It states that bankruptcy will follow such a condition, but that a rate of 7 cents would be likely to bring a gross income of $734,355.

Illinois Traction Petitions to Handle Freight Into St. Louis

The Illinois Traction System has asked the city of St. Louis, Mo., for permission to handle carload freight into the city in order to supply many of the industries along its lines with coal and to haul carload business. At present the road is permitted to carry only passengers, mail and wrapped bundle freight. A hearing on the application for an amendment of its franchise ordinance was held by the public utilities committee of the Board of Aldermen on Jan. 14. The Aldermen decided to hold a general public hearing on the matter on Jan. 29. A similar bill has been advocated several times in recent years, but it always failed to get beyond the committee.

In speaking at the hearing on Jan. 14, H. I. Green, general counsel Illinois Traction System, declared that more than twenty industries along the company's lines between the McKinley Bridge and the Twelfth Boulevard station at Lucas Avenue have petitioned for the direct freight service the company seeks to install. All can be served without any further track extensions except spurs into their places of business. Mr. Green informed the Aldermen that of the system's 600 miles of tracks, 450 miles have direct connection into St. Louis. He said it is an imposition to ask shippers to continue to haul freight to and from the foot of the McKinley Bridge.

Buses of Connecticut Company Get Into Movies

An 800-ft. film to show how its buses are kept in operating condition at its main garage in New Haven has been prepared by the Connecticut Company, New Haven. A somewhat similar film was prepared some years ago with the trolley cars as the subject. The bus movie was shown at the company's booth at the Hartford Industrial Fair this past week and attracted very favorable attention.

The film story is based on a conversation between two bus passengers as to the way in which the company keeps its buses in so good a condition. The conversation is held in the central part of New Haven, after one of the single-deck Yellow type D buses, carrying 29 passengers, has made a passenger stop. The scene of the film then changes to the company's garage in New Haven. An exterior of this garage is first shown. Then, the spectator is introduced to the repair and maintenance methods of the company and learns how the buses are fueled and oiled at the end of the runs, how tires are changed, how the buses receive their periodical inspection, and how they are washed daily. Other views illustrate the process of removing the engine from the chassis through the use of an overhead crane, how the engines are taken apart and inspected, how cylinders are ground and pistons fitted.

Seven Cents Not Yet Authorized in Binghamton

The Public Service Commission issued an order Jan. 16 authorizing the Binghamton Railway, Binghamton, N. Y., to continue in effect the present 6-cent fare pending a determination by the commission of the company's petition for an increase in fare to 7 cents. The 6 cent fare expired Jan. 16. It has been in effect since 1920, but has been continued from year to year by the city and the commission.

Hearing is scheduled for Jan. 23, in New York. Consent of the city of Binghamton to the proposed increase was referred to previously.

Davenport Will Continue on Lower Fare Temporarily

The financial statement of the Tri-City Railway, Davenport, Iowa, for the 6 months test period ended Dec. 31, 1924, shows a marked deficit in operating expenses. Despite this the company has notified Mayor Louis E. Roddewig and the Davenport City Council that the right to increase fares to 10 cents straight on Feb. 1 will not be enforced for the present and that the sale of three tickets for a quarter will be continued until a more satisfactory adjustment of the fare problem has been worked out. In a letter to the Mayor and the City Council, R. J. Smith, general manager, announced that the company will retain the existing rates for the present, in the hope that future patronage of the railway lines will show that the patrons of the company appreciate the lower fares granted to regular patrons through the sale of tickets.

In making this announcement, the company calls attention to the fact that the offer to retain this present rate of fares must not be construed to mean that the company has relinquished its right under the fare agreement made with a previous Council. This agreement gave the company the right to increase its rate of fare to 10 cents straight on Feb. 1, 1925, if the income of the six preceding months failed to show a return of at least 6 per cent on the company's investment.

Montreal Tramway to Expand

Montreal's rapid growth in the past few years has brought about serious problems of traffic congestion that can only be solved by broad and sweeping changes in the downtown handling of the service by the Montreal Tramway, Montreal, Que, says the *Canadian Financial Post*. That paper says construction work will proceed very soon on a new terminal station on Craig Street, in the downtown section.

The new terminal station will be a modest affair at first, consisting merely of a covered structure adjacent to the power building, but it may in time become a sky-scraping head office for the tramways. Small as is the initial structure, the land acquired is costing the company about $500,000.

A committee of citizens and civic officials is now quietly at work producing a town-planning scheme for Montreal, and if some of the suggestions before the committee mature, the tramway and the city will have to cooperate in the construction of new lines, tubes and "arcades." The latter, while not touching the tramway directly, will enable it to improve its service. The plan is to move sidewalks on some main thoroughfares back about 10 ft. and build arcades under business structures to allow this to be done.

One of the local newspapers recently printed a story that the company intended to purchase the Montreal & Southern Countries Railway, but this was denied by officials. The line serves suburbs south of the St. Lawrence River. It is owned by Canadian National Railways.

News Notes

Resumption of Service Expected.—Public subscriptions taken during the last fortnight have pledged sufficient funds for the repair of the Lincoln Municipal Street Railway, Lincoln, Ill. Mayor Voepel has predicted the early resumption of service on the traction line, suspended after the mid-December storm. Service, however, will be limited and fewer cars operated.

Jitneys in Richmond Disappear. — Jitneys passed out of existence in Richmond, Va., on Jan. 1 after being the cause of dissension for many years. Determined efforts were made to prevent their cessation by jitney interests. Patrons of the jitneys questioned the legality of the ordinance which was passed in the City Council last summer by a small margin. The City Council had previously defeated the ordinance several times.

Wants Continuous Seven-Cent Fare.—The Board of Commissioners of Bradley Beach, N. J., has requested the Coast Cities Railway for a continuous 7-cent fare from Bradley Beach to Deal Lake. A conference will be held on the matter. The company was also asked to grant a transfer at Main Street, Asbury Park.

Refuses Bus Fare Increase.—The Michigan Public Utilities Commission recently refused to accept the petitions of the Star Motor Coach Company and the Wolverine Transit Company for a further increase in fares to 2½ cents a mile. The two companies started some weeks ago a co-ordinating service with the Detroit United Railways.

No Reason for Granting Bus Permits.—Despite agitation by a few citizens of Webster, Mass., advocating the granting of bus licenses, Selectmen of the town have issued statements declaring they would not be warranted in granting licenses to buses to run parallel to the lines of the Worcester Consolidated Street Railway. The Selectmen do not agree with the unfavorable criticism of the railway, particularly of its service. Sight is taken of the fact that the Consolidated has contributed a large sum toward the new East Webster bridge, has paid for cement work around the tracks on Main Street and incurred much other expense in improving its lines.

Not Opposed to Buses Which Do Not Parallel Car Lines.—President Wesley W. Sargent of the Fitchburg & Leominster Street Railway says he will not oppose buses either inside or out of Fitchburg, Mass., so long as they do not run parallel to the car lines. Mr. Sargent said he was willing that the bus operators run bus lines over sections of the city where the railway had failed to make its lines pay, but he did not believe they should be allowed to compete with the railway.

Wants Railway Service Restored.—A petition signed by 1,560 residents of Spencer and Leicester, Mass., for restoration of railway service between Spencer and Worcester has been forwarded to the Worcester Consolidated Street Railway. The company discontinued service to Leicester and Spencer because unfair competition was permitted by local officials from bus lines.

Increased Rates in Effect.—The Empire State Railways, which operates a line between Syracuse and Oswego, N. Y., and the Rochester & Syracuse Railroad, which operates lines to Rochester, have put into effect new fare increases based on a rate of 3.6 cents a mile. The old rate was 3 cents a mile. Under the provisions of the Public Service Commission order the minimum fare is to be 5 cents, as at present. The Rochester line also secured an order reducing from 60 to 50 the number of persons required for a chartered car. Corresponding changes have been made in the charter car rates.

Another Direct Service to Downtown Chicago.—The Chicago & Joliet Electric Railway, control of which passed into the hands of Samuel Insull recently, will be linked direct to downtown Chicago in the near future via the elevated structure. Rapid transit will be afforded a great undeveloped territory heretofore unserved by any single agency going direct downtown.

Wife of Prominent Official Dies.—Mrs. Britton I. Budd, wife of the president of the Chicago Rapid Transit Company, Chicago, North Shore & Milwaukee Railroad and Public Service Company of Northern Illinois, died on Jan. 18 after an illness of several years. For many years Mrs. Budd took a very active part in charitable and social service work. She was an ardent student of music, astronomy, architecture and history. She was formerly secretary of the Amateur Music Club of Chicago and treasurer of the Guild of Associates of the Sisters of Saint Mary of the Episcopal Church. Interment was at Rosehill Cemetery after a private funeral service at the Church of the Atonement, Chicago.

Increased Fares Allowed.—Increased rates on the Pennsylvania-Ohio Power & Light Company's line between Youngstown and Hubbard call for a cash fare of 20 cents, but provide for commutation tickets at $3 good for 46 rides. Between Youngstown and stops 15 and 28 the tariff provides a cash fare of 10 cents and includes a provision for a ticket rate of six tickets for 50 cents. Increased rates were filed some few years ago, but were restrained by a court order. The United States Supreme Court recently dismissed the injunction.

Interurban Commutation Books at Discount.—The Texas Interurban Railway, Dallas, Tex., effective Jan. 1, has begun issuing commutation books of 30 tickets between designated stations at a discount of 40 per cent from the regular one-way adult fare. These books are good for 30 one-way trips within 20 days from date of sale.

Seeks Higher Fare.—The Manchester Street Railway, Manchester, N. H., has petitioned the Public Service Commission for permission to increase its fares from 8 cents to 10 cents. The company claims that one-man cars have saved some money, but the loss in passengers carried has more than offset the saving. The number of passengers carried in 1924 was the lowest since 1913.

Foreign News

Great Grimsby, England, to Operate Tramways. — The tramway in the Borough of Great Grimsby is to be purchased from the Great Grimsby Street Tramways Company by the city. The price to be paid was referred to arbitration and was fixed at £109,848, no allowance being made to the tramway company for possible loss due to the severance of the purchased lines from those outside the borough. The gross revenue inside Great Grimsby is about £44,368 per annum.

Reduced Student Fares Demanded in Turkey.—Demanding that special fares should be granted to them, a number of students made a demonstration against the Société des Tramways et Electricité de Constantinople, not only holding up operation of the electric street railways, but doing some damage to the company's office. Under pressure from the local authorities the tramway company granted reduced fares to the students for a period of 10 days, pending the submission of the question to the Turkish government at Angora. A decision was given in the tramway company's favor and orders issued for the protection of its property against further damages.

Paris Cars and Buses to Carry Merchandise.—Packages or merchandise are to be carried on the cars and buses operated by the Paris Transports en Commun. During certain hours half the rear platform space will be reserved for the purpose, and at night the entire platform will be used. The day rate will be the same as a full passenger fare for parcels weighing from 22 to 55 lb., and two fares for parcels from 55 to 110 lb., which is the heaviest permitted. The night rate will be uniform at 1.5 francs for parcels up to 110 lb.

Moscow to Buy Buses.—The government of Moscow, Russia, plans to place orders for buses abroad to the amount of 10,000,000 rubles, according to an announcement made by the Soviet deputation which has been visiting London, Paris and Berlin to study municipal questions. Offers of French firms were most acceptable and they received the first order.

Barcelona Opens New Subway.—The metropolitan subway of Barcelona, Spain which has been under construction for 10 years or more, has been inaugurated under the official auspices of the Infante Ferdinand, representing the King. This single route underground electric railway connects two opposite quarters of the city, supplementing an otherwise adequate street car system.

Japan to Electrify Railroads.—The Japanese government is planning to electrify 400 miles of its main line railroads, according to T. Ogawara of Tokio, assistant director of the government railway engineering bureau, who is in the United States traveling in the west. The purpose of Mr. Ogawara's visit is to study the steam and hydroelectric plants of the United States and to discuss Japan's need with American manufacturers of equipment.

Financial and Corporate

Purchase Talk Revived at San Francisco

The special committee appointed by Mayor Rolph of San Francisco, Cal., to consider purchase of the Market Street Railway is scheduled for a meeting at which it is expected arrangements will be made for further negotiations with officials of the Market Street Railway to try to bridge the difference in valuations.

The Council has before it a revised appraisal of the Market Street Railway just completed by Fred Bullock, special accountant. It is said that his figures will bring the valuation up to nearly $30,000,000, compared with $27,000,000 three years ago.

Alternative plans for carrying out the proposal have been suggested as follows:

1. Vote bonds either for the entire purchase price or enough to provide a down payment to the company.
2. Amend the charter to permit an increase of fares to 6 cents to provide greater revenue in a "pay-as-you-go-plan."

When negotiations were in progress earlier in the year, the "pay-as-you-go-plan" was agreed upon as the best means of financing the purchase. It is said now that the adoption of a plan of this kind would be out of the question, particularly under the increased schedule now in force to trainmen.

Refunding Plan at Worcester to Be Modified

Instead of drawing up a new consolidated mortgage the Worcester Consolidated Street Railway, Worcester, Mass., has altered its plans and will use a first mortgage instrument, under which $3,551,000 bonds are held in the treasury unissued.

In November a petition was filed with the Massachusetts Public Utilities Commission requesting authority to set up a mortgage, subject to underlying liens, whereby $7,000,000 in consolidated mortgage bonds could be issued primarily to retire maturing bonds. Because of the size of the underlying liens, it was finally decided that the offering would probably meet with greater success and command a better price if the old first mortgage was used as the financing instrument. The company therefore plans to withdraw the petition before the Public Utilities Commission and ask authority to issue additional bonds under the old first mortgage.

The maturities of the company during the next 3 years total $3,083,000 Under the first mortgage, which is known as the Worcester Consolidated Street Railway first and refunding mortgage, the company issued $1,449,000 of 4½ per cent bonds in 1910. As the authorized limit is $5,000,000 the company still holds $3,551,000 unissued bonds.

A problem before the company is the interest rate. It is probable that the new securities will carry an additional coupon to be cashed with the semi-annual 2¾ per cent coupon.

Approval of Permanent Financing Measure Sought in Philadelphia

W. C. Dunbar, president of the Philadelphia Rapid Transit Company, Philadelphia, Pa., has submitted the draft of an ordinance to the president and members of the City Council seeking permission definitely and permanently to place its $10,000,000 5 per cent issue authorized in 1911. Two changes are desired in the financing of these bonds in order to take advantage of the present favorable market conditions. First, the company wishes to increase the interest rate from 5 per cent to 6 per cent, which will enable it to sell the bonds at or near par. Second, it is desired to make the bonds a direct mortgage lien upon the Market Street Elevated Passenger Railway. The statement says that this is a change in form but not in substance, since under the existing provisions of the indenture now securing the issue the entire equity in the Market Street property is indirectly pledged. The proceeds derived from the sale of these bonds will be used, first, to pay off the loan already secured and for which these bonds are now held as collateral, and, second, to finance the down payment upon the equipment purchased under the P. R. T. series "H" equipment trust and for other additions and betterments to property.

Duluth Valuation Fixed at $5,009,510

Court Decides 6-Cent Fare, with Five Tickets for 25 Cents, Confiscatory—Adds 40 per Cent to Pre-War Cost of Pre-War Property to Give Effect to Present Day Prices

JUDGE WILBUR F. BOOTH of the District Court of the United States for the District of Minnesota on Dec. 29, 1924, rendered a decision in the suit brought by the Duluth Street Railway to enjoin the enforcement of an order of the Railroad and Warehouse Commission of Minnesota fixing the rate of fare at 6 cents cash with five tickets for 25 cents. The city of Duluth appeared as intervenor-defendant in the suit. The court fixed the fair rate base at $5,009,510 and found a 7½ per cent rate of return reasonable. The decision was referred to briefly in the ELECTRIC RAILWAY JOURNAL for Jan. 10, page 73.

On July 13, 1922, the Railroad and Warehouse Commission made its first finding of fair value, rate of return and rate of fare. This it did under the new statute of the state of Minnesota enacted April 14, 1921, under which the street railways of the state were authorized to surrender existing franchises with the municipalities and accept indeterminate permits of the state of Minnesota, subject to regulation by the state commission and subject to an appeal providing for the trial of the case *de novo* by the state courts of Minnesota and consequently requiring the introduction of detail evidence of inventory, valuation, etc., in such case.

SIX-CENT FARE UNDER COURT ORDER

The Duluth company secured from the United States District court, Judges Sanborn, Morris and Booth presiding, a temporary restraining order permitting the charge of a 6-cent cash fare and compelling the company to issue receipts to passengers desiring to take advantage of the 5-cent ticket rate and the revenue representing such receipts to be held in escrow pending the final decision of the United States court in respect to the rate of fare. The case was tried before the Special Master in Chancery, who rendered his report to the United States court on Dec. 10, 1923. Exceptions were filed by

COMPARATIVE VALUATIONS OF DULUTH STREET RAILWAY—DULUTH DIVISION

	A. L. Drum & Co. Estimated Original Cost	Minnesota Railroad and Warehouse Commission's Decision, Dated July 13, 1922	Decision of U. S. District Court, Dated Dec. 29, 1924
Inventoried property excluding land and materials and supplies	$3,487,020	$3,487,020	$3,487,020
Expenditures not apparent in inventory	6,385	.....	6,385
General overheads	759,642	488,183	369,534
Land	150,735	140,000	128,474
Materials and supplies	105,787	105,000	105,000
Cash working capital	87,312	30,000	30,000
Total cost new	$4,596,881	$4,250,203	$4,126,413
Appreciation of pre-war property to give effect to present-day prices	.....	514,797	1,132,075
Per cent appreciated	.....	16.04	40.00
Total cost new, after giving effect to present-day prices	$4,596,881	$4,765,000	$5,258,488
Condition of depreciable property, per cent	86.02	83.00	83.00
Amount of depreciation deducted	510,548	763,300	786,331
Total cost new less depreciation, after giving effect to present-day prices	$4,086,333	$4,001,700	$4,472,157
Cost of financing	229,844	.....	89,075
Total physical property	$4,316,177	$4,001,700	$4,561,232
Going value	800,000	500,000	350,000
Value of power contract	379,542	91,300	91,300
Additions July 1, 1921, to Dec. 31, 1921	6,978	6,978	6,978
Grand total	$5,502,697	$4,599,978	$5,009,510

the interested parties and the case was heard by Judge Booth.

The decision rendered by Judge Booth released the company from impounding funds to cover the 5-cent ticket rate and establishes several important points in the valuation of electric railway properties. For instance, the court held:

1. That when the Railroad and Warehouse Commission made and filed its findings the legislative stage of the case was ended at that point and the judicial stage was reached and that the hearing before the state District Court on appeal provided for in the Minnesota statute is judicial and not a continuation of the legislative rate-making process, and that under such circumstances the street railway company had the right to bring the present suit in the federal court.

2. That a test period of rates fixed by the commission is not an indispensable prerequisite and that the present suit in the United States court was not premature as contended by the state commission and the city of Duluth.

As to the fixing of rates by the United States court, the court said:

The proceedings before the special master and in this court are not for the purpose of fixing a rate, but to determine whether the rate fixed by the commission is confiscatory. In Pacific Gas & Electric Company vs. City and County of San Francisco, United States Supreme Court, June 2, 1924, the court said: "Rate making is no function of the courts. Their duty is to inquire concerning results and uphold the guarantees which inhibit the taking of private property for public use without just compensation, under any guise."

Nevertheless, it is held that the parties are entitled to the independent judgment of the court upon the findings and conclusions of the commission. Bluefield Co. vs. Pub. Ser. Com., 262 U. S., 679, 689.

The court added 40 per cent increase to the estimated pre-war cost of pre-war property to give effect to present day prices.

The court allowed a per cent condition of 83, the same as found by the commission, as compared with the per cent condition of 86.02 found by A. L. Drum & Company, consulting engineers for the company, from the inspection of property.

The court allowed the estimated original cost of general overheads without depreciation.

The court allowed $91,300, the value found by the commission, for the hydro-electric contract for power. In discussing the power contract the court stated:

This contract has proved very advantageous and the steam plant has been superseded and has been dismantled. A larger amount would have been justified (referring to the $91,300 allowed by the commission). . . . The master allowed nothing for this item, saying in his report:

"While this contract might be taken into consideration upon a sale of the property or a valuation for that purpose, it should not be considered in ascertaining the proper basis for rates as it belongs to the class of provident economical contracts which it is the duty of the company to make whenever possible so as to furnish economical service to the public."

I am not able to agree with the master in this view. The contract was a thing of value, and it differed from an ordinary contract for current supplies. It took the place of a physical plant which would otherwise have been necessary and would have been valued as a part of the physical items.

Under these circumstances I think the commission was justified in including this power contract as an item in the rate base.

The court allowed $350,000 for going value figured on 10 per cent on the original cost of the inventoried physical property, excluding land and materials.

The commission excluded cost of financing, but the court allowed $89,075 for cost of financing, stating:

In my opinion this is an item which should only be included provided the evidence shows that it had an actual as distinguished from a theoretical existence.

The court allowed the 7½ per cent rate of return as found by the commission.

The court allowed an item of hidden costs claimed by the company for expenditures incurred in the past on account of contributions imposed by city ordinances for civic improvements.

The court and commission adopted as plant base the estimated original cost of the inventoried property, excluding land and material and supplies, as agreed upon between A. L. Drum & Company, consulting engineers, representing the Duluth Street Railway, and B. T. Gifford, consulting engineer, representing the city of Duluth.

The tabulation published herewith gives a comparison of the values of the property as found by the United States court with the values found by the Minnesota commission and with the estimated original cost valuation found by A. L. Drum & Company.

The Master in Chancery found the value of the property under the several different bases to be as follows:

Value for rate-making purposes	$4,599,978
Cost of reproduction, less depreciation, including going value	5,138,504
Estimated original cost	4,222,573

Separate Investment Company in New Jersey

Articles of incorporation for the Public Service Stock & Bond Company, Newark, N. J., organized to do a general business in investment securities, but to specialize in securities of the Public Service Corporation of New Jersey and its subsidiaries and underlying companies, were filed on Jan. 16 with the Secretary of State at Trenton.

The incorporators are Thomas N. McCarter, president of the Public Service Corporation of New Jersey; E. W. Wakelee and Percy S. Young, vice-presidents. The papers authorize 500,000 shares of no-par-value stock, which will be owned, except for qualifying directors' shares, by the Public Service Corporation. A million dollars will be paid into the treasury of the new company at the start of business on Feb. 1.

Mr. Young, in charge of finance of the Public Service Corporation, said:

The success of our various customer-ownership campaigns has given us a total of more than 70,000 stockholders and subscribers to stock. Adding bondholders and those who own securities of underlying companies, there are more than 120,000 financially interested in various Public Service enterprises.

Mr. McCarter will be president and Charles G. Colyer vice-president, in charge of the company's activities. T. W. Van Middlesworth will be treasurer and Charles M. Broder secretary. The company will have offices in the Public Service Terminal Building, Newark.

Customer-Ownership Campaign at Reading

Customer ownership is the purpose of a campaign being conducted by the Reading Transit Company, Reading, Pa., for the sale locally of $1,250,000 of first and refunding mortgage gold bonds, series A, 6 per cent, dated Nov. 1, 1924, and due Nov. 1, 1954. The offering price is 98 and accrued interest to yield 6.15 per cent. In calling attention to the offering the company said that another opportunity is offered prudent investors to share in the earnings of one of their important public utilities, the first having been afforded in the sale of cumulative participating

Conspectus of Indexes for January, 1925

Compiled for Publication in this Paper by

Albert S. Richey
Electric Railway Engineer
Worcester, Mass.

	Latest	Month Ago	Year Ago	Since War High	Since War Low
Street Railway Fares* 1913 = 4.84	Jan. 1925 **7.17**	Dec. 1924 **7.17**	Jan. 1924 **6.91**	May 1921 **7.24**	May 1922 **6.88**
Street Railway Materials* 1913 = 100	Jan. 1925 **150.3**	Dec. 1924 **148.7**	Jan. 1924 **158.5**	Sept. 1920 **247.5**	Oct. 1924 **148.5**
Street Railway Wages* 1913 = 100	Jan. 1925 **221.0**	Dec. 1924 **220.8**	Jan. 1924 **217.4**	Sept. 1920 **232**	Mar. 1923 **206.8**
Steel—Unfilled Orders (Million Tons) 1913 = 5.91	Dec. 30 1924 **4.82**	Nov. 30 1924 **4.03**	Dec. 31 1923 **4.45**	July 31 1920 **11.12**	July 31 1924 **3.19**
U. S. Bank Clearings Outside N. Y. City (Billions)	Dec 1924 **18.23**	Nov. 1924 **16.66**	Dec. 1923 **17.30**	Mar. 1920 **18.54**	Feb 1922 **10.65**
Business Failures Number	Dec. 1924 **18,07**	Nov. 1924 **1,471**	Dec. 1923 **1,858**	Jan. 1924 **2,231**	Sept. 1924 **1,277**
Liabilities (Millions	**51.60**	**29.51**	**80.30**	**122 95**	**27.71**

	Latest	Month Ago	Year Ago	Since War High	Since War Low
Eng. News-Record Construction costs 1913 = 100	Jan. 1925 **210.4**	Dec. 1924 **208.6**	Jan. 1924 **217.9**	June 1920 **273.8**	Mar. 1922 **162.0**
U.S. Bur. Lab. Stat. Wholesale Commodities 1913 = 100	Dec. 1924 **157.0**	Nov. 1924 **152.7**	Dec. 1923 **151.0**	May 1920 **247**	Jan. 1922 **138**
Bradstreet's Wholesale Commodities 1913=9 21	Jan. 1 1925 **13.93**	Dec. 1 1924 **13.53**	Jan. 1 1924 **13.27**	Feb. 1 1920 **20.87**	June 1 1921 **10.62**
Dun's Wholesale Commodities 1913 = 120.9	Jan. 1 1925 **202.6**	Dec 1 1924 **198.0**	Jan. 1 1924 **189.9**	May 1 1920 **263.3**	July 1 1921 **159.8**
U.S. Bur. Lab. Stat. Retail food 1913 = 100	Dec. 1924 **152**	Nov. 1924 **150**	Dec. 1923 **150**	June 1920 **219**	Mar. 1922 **139**
Nat. Ind. Conf. Bd. Cost of living 1914 = 100	Dec. 1924 **166.1**	Nov. 1924 **165.2**	Dec. 1923 **165.0**	July 1920 **204.5**	Aug. 1922 **154.5**

*The three index numbers marked with an asterisk are computed by Mr. Richey, as follows: Fares index is average street railway fare in all United States cities with a population of 50,000 or over except New York City, and weighted according to population.

Street Railway Materials index is relative average price of materials (including fuel) used in street railway operation and maintenance, weighted according to average use of such materials.

Wages index is relative average maximum hourly wage of motormen, conductors and operators on 100 of the largest street and interurban railways in the United States, weighted according to the number of such men employed.

preferred stock of the Metropolitan Edison Company, with which the Reading Transit is affiliated.

The fact is emphasized that net earnings of the railway during the past year were more than three and one-half times the interest requirements on these bonds and the underlying divisional bonds. It is further pointed out that the mortgage under which the bonds are issued provides that 18 per cent of the gross revenues shall be devoted to the maintenance of the property each year, this amount being based on the experience of recent years, during which about $200,000 was expended annually on the upkeep of the system.

The issue of bonds now offered is a direct first mortgage on important property owned by the company in and about the city of Reading, conservatively valued at $2,600,000. This property includes the two main office buildings on South Fifth Street, carhouses, shops, other buildings, and the two plots of land they occupy on North Tenth and Eleventh Streets, the entire system of the Reading & Womelsdorf Electric Railway and all of the cars owned by the company, about 200 in number.

The proceeds from the sale of the bonds are to be used to retire $400,000, principal amount, of first mortgage bonds of the Reading & Womelsdorf Electric Railway, which fell due on Jan. 1, 1925, $40,000 principal amount of car equipment trust certificates and for other corporate purposes, principally improvements and betterments that are expected to be reflected in increased earnings for the company.

The Reading Transit Company was formerly known as the Reading Transit & Light Company. It operates about 200 miles of electric railway which it owns outright or controls through long-term leases, serving a population of more than 425,000.

Railway Service Discontinued in Rutland

Railway service in Rutland, Vt., has been withdrawn by the Rutland Railway, Light & Power Company. This move entirely eliminates electric railways as a transportation factor in and around Rutland, other lines connecting Rutland with neighboring towns having been supplanted previously by bus service. The buses that are being operated in the territory abandoned are not affiliated in any way with the railway. Rutland is a town of 15,000 inhabitants. Included in the railway system were 30 miles of track. The cash city fare has been 7 cents with four tokens for 25 cents.

Made Director.—J. S. McCulloch, president of the Union National Bank, Philadelphia, has been named successor to Col. Sheldon Potter as city member of the board of directors of the Philadelphia Rapid Transit Company. Colonel Potter resigned a month ago.

Foreclosure Ordered.—Foreclosure of a mortgage of $375,000 against property of the Groton & Stonington Street Railway, Norwich, Conn., has been ordered by Anson T. McCook of Connecticut, acting in response to the request of a majority of bondholders. The Groton & Stonington Street Railway was controlled by the Groton & Stonington Traction Company, included in the system of the Shore Line Electric Railway.

Purchase Permitted. — The Public Service Commission has issued an order consenting to the purchase by the Niagara Falls Power Company of the capital stock of the Niagara Gorge Railroad and to the creation of a trust indenture for $1,000,000 and the issue of $949,000 in Niagara Gorge collateral trust 5 per cent gold bonds to be secured thereby. The power company has plans for the improvement of the road and the extension of its business, it was brought out at the hearing at Buffalo on Dec. 29. Certain riparian rights in the lower Niagara River are also acquired by the purchase of the railway.

Report of Portland Purchase.—The Albert Emanuel Company, New York, is reported to be negotiating for the purchase of three blocks of stock in the Cumberland County Power & Light Company, Portland, Me., which controls the Portland Railroad. The blocks which will be purchased if the deal goes through are said to be the holdings of E. W. Clark & Company of Philadelphia, J. & W. Seligman & Company, New York, and A. B. Leach & Company, New York. All the stock which figures in this transaction is common stock. Common stock in the company amounts to 30,000 shares. There are 40,000 shares of the preferred stock.

Most of Equipment to Be Scrapped.—The tracks and equipment of the Milford, Attleboro & Woonsocket Street Railway will be scrapped, according to Simon I. Edinburg of the Edinburg Meter Company, Worcester, Mass., who has purchased the equipment from the receivers. The cars were not included in the sale. The purchase price was not divulged. The property was bought subject to the approval of the Superior Court. There is about 30 miles of trackage. The line was abandoned more than a year ago.

New Members of Board Chosen.—At the meeting on Jan. 19 the number of directors of the Brooklyn-Manhattan Transit Corporation, Brooklyn, N. Y., was increased from 16 to 18. Charles Hayden and Travis H. Whitney were added to the board.

Property Transferred.—The Tiffin & Fostoria Railway, Tiffin, Ohio, ceased to exist on Jan. 1. Sale of the company's properties, a 14-mile line linking Tiffin and Fostoria, to the Toledo, Fostoria & Findlay Railway was completed with a formal transfer made on Jan. 1. The purchasing company will continue the operation of the line on a rearranged schedule and will start a through Toledo-Findlay service.

Purchase Makes Personnel Change in Property.—The purchase of the Chicago & Joliet Electric Railway, Joliet, Ill., by the Central Illinois Public Service has caused changes in the official personnel of the new company. J. R. Blackhall, general manager of the railway, has been re-elected a director with William Redmond and George Woodruff, Joliet. Marshall E. Sampsell, Chicago, was elected president and a director, succeeding Van Horn Ely, Philadelphia; Mr. Blackhall is vice-president; Martin J. Insull, Chicago, is a director, succeeding C. S. L. Tingley, Philadelphia; LeRoy J. Clark, Chicago, succeeds W. G. Clayton, and J. Paul Clayton, Springfield, succeeds W. R. Lippincott, Philadelphia. The complete official personnel is: Mr. Sampsell, president; J. Paul Clayton and J. R. Blackhall, vice-presidents; Mr. Clark, secretary; C. L. Nash and R. N. Tulpin, Springfield, assistant secretaries; C. E. Cripe, Springfield, treasurer, and C. Nash, Springfield, assistant treasurer.

Sale of Railway Reported Under Way. — Sale of the Valley Railways, Lemoyne, Pa., operating 44 miles of electric railway, principally in Carlisle and Lemoyne, is now virtually certain, subject only to the approval of the Public Service Commission. Almost 95 per cent of the stockholders have assented and deposited their stock, and about 80 per cent of the holders of the $1,700,000 bonds have done likewise. The offer of purchase is said to have been on the basis of par for the bonds and $44 a share for the stock. The identity of the purchaser has not been disclosed.

Preferred Stock Issue Proposed in Philadelphia.—The annual meeting of the stockholders of the Philadelphia Rapid Transit Company, Philadelphia, Pa., will be held on March 18 to elect directors for the ensuing year, and transact such other business as may come before the meeting, including the approval or disapproval of a proposed increase of the capital stock of the company from $30,000,000 common stock to $30,000,000 common stock and $3,000,000 preferred stock or a total increase from $30,000,000 common stock to $33,000,000 common and preferred stock.

Railway Man Bus Bidder.—Harry B. Weatherwax, vice-president of the United Traction Company, Albany, N. Y., was one of the bidders at the recent sale of the franchise and equipment of the W.I.A.T. Bus Corporation before Justice Frank Cooper in federal court. Rutherford B. Hayes, prominent Albany builder and contractor, bid in the franchise and equipment at $14,050. Mr. Hayes announced his plans to buy 10 new buses and spend nearly $100,000 to rehabilitate the line. Benjamin Wheat was the other bidder. Mr. Weatherwax instructed his attorney to stop bidding at $14,000, while Mr. Wheat withdrew from the bidding at $9,100. The purchase must be approved by the Common Council of the city of Albany and the Public Service Commission before the transaction will become effective.

Sale of More Railway Lines Said to Be Under Way.—Negotiations for the sale of more American Electric Power Company properties to other utility interests are reported from Philadelphia. The properties are the Scranton Railway, Scranton, Pa., and the Altoona & Logan Valley Electric Railway, Altoona, Pa. The American Electric Power Company recently sold the Chicago & Joliet Electric Railway, along with other properties, to the Central Illinois Public Service Corporation, acting for the Middle West Utilities Company, Chicago.

Personal Items

J. P. Barnes Heads Kentucky Utilities Association

James Phillips Barnes, president of the Louisville Railway, Louisville, Ky., has had another honor conferred upon him. He has just been elected president of the Kentucky Association of Public Utilities, meeting at the Hotel Seelback, Louisville, Jan. 16. In that post he succeeds J. P. Pope, general manager of the Kentucky Traction & Terminal Company, Lexington. Mr. Barnes was the subject of an extended biographical sketch in the issue of the ELECTRIC RAILWAY JOURNAL for Jan. 23, 1923, on the occasion of his election to the presidency of the Central Electric Railway Association. Association honors are accordingly not new to him. As far back as 1917 he was president of the New York Electric Railway Association. He has also been a member of the executive committee of the American Electric Railway Association.

Wherever he has been located in a managerial capacity Mr. Barnes has been sought out for important association work because of his ability to mix and to get things done through cooperation. This ability has been recognized outside of official railway circles, with the result that the roster of Mr. Barnes' activities there includes his acting as a president of the Louisville Council, Boy Scouts of America; treasurer of the Arts Club and a director of the Citizens' Union National Bank and the Louisville Industrial Foundation. Probably not even Mr. Barnes himself could name all the clubs and associations of which he is a member in Louisville and other cities.

Alfred S. Davis Promoted at Providence

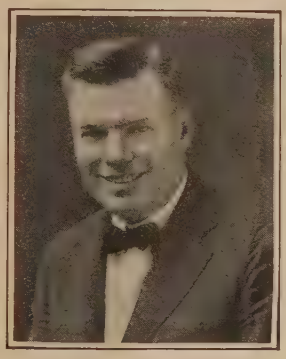
Coincident with the election of Walter Slade as vice-president of the United Electric Railways, Providence, R. I., Alfred S. Davis was appointed to the position of superintendent of power and lines. He has assumed full charge of the duties formerly performed by Mr. Slade. Mr. Davis is a newcomer in Providence. When the company launched a power expansion program about 2 years ago his services were secured. He was then assistant superintendent of power and lines. Previous to that time he had spent 2 years with Stone & Webster. He had also had experience in supervising power plants for the Connecticut Company. Mr. Davis' early engineering work began in 1900 with Eaton, Chase & Company.

After 4 years with this concern in the practice of installing steam and electrical machinery, he entered Tufts College and was graduated in 1908 with the degree of B.S. He then spent several years with the J. G. White Engineering Corporation and one year with the Electric Bond & Share Company. The appointment of Mr. Davis to the United Electric Railways was mentioned in the ELECTRIC RAILWAY JOURNAL, issue of Jan. 20, 1923.

L. C. Datz with Bankers

Engineer Joins Newman, Saunders & Company, Inc., St. Louis Reorganization Managers

L. C. Datz has resigned as chief engineer of the Memphis Power & Light Company to become affiliated with the firm of Newman, Saunders & Company, in the reorganization of public utility properties in the Middle West. He will make his headquarters in St. Louis. Mr. Datz has been actively engaged in public utility work ever since he was graduated from Tulane University of Louisiana in 1901, with the exception of 2 years when he was associated with a New Orleans contractor in designing and constructing dredges, dredging and cane loading machinery.



L. C. Datz

In 1903 Mr. Datz entered public utility work with the New Orleans Railway & Light Company. In 1911 he went with Ford, Bacon & Davis as assistant engineer, and a year later, when the American Cities Company was organized by Ford, Bacon & Davis and the New Orleans Railway & Light Company became a part of this group of Southern properties, he returned to the New Orleans company and served successively as engineer maintenance of way, engineer of roadway and chief engineer of this system.

When the United Gas & Electric Engineering Corporation established an office in the South in 1914, Mr. Datz became engineer of its Southern properties, with supervision of public utility properties in New Orleans, Houston, Birmingham, Memphis, Knoxville and Little Rock. He resigned as vice-president of this corporation in 1919, to become chief engineer of the American Cities Company, which at that time formed an organization of its own to supervise its properties. He served in this capacity until April, 1922, when the American Cities Company was taken over by the National Power & Light Company, at which time he went to Memphis, Tenn., to become chief engineer of the Memphis Gas & Electric Company, and chief engineer of the Little Rock Railway & Electric Company, now under the supervision of the Electric Bond & Share Company.

When the Memphis Power & Light Company was organized on Jan. 1, 1923, Mr. Datz became chief engineer of that company, and since then has given his entire attention to the very extensive construction program it has carried on in the past two years.

Mr. Datz has always taken an active interest in engineering association work, both national and local. He is a member of the National Electric Light Association and of the American Electric Railway Engineering Association, serving as president of the latter in 1923. He is a member of the American Society of Mechanical Engineers, American Society of Civil Engineers, American Society for Municipal Improvements, and a member and past-president of the Louisiana Engineering Society.

H. W. Brundige President of California Commission

Harley W. Brundige has been elected president of the Railroad Commission of California. He succeeds Commissioner Clyde L. Seavey, who has held that position for the last 2 years.

Commissioners George D. Squires and Ezra W. Decoto, who were appointed by Gov. Friend W. Richardson to succeed Commissioners Irvin Martin and James T. Whittlesey, terms expired, have assumed their duties as members of the commission.

Commissioner Squires served as Insurance Commissioner of California the last 2 years. He is a practicing attorney. Commissioner Decoto has served a number of years as District Attorney of Alameda County. He is also an attorney of many years experience.

Bert Collett General Manager at Oak Park

Bert Collett, general superintendent of the Chicago & West Towns Railway, Oak Park, Ill., since 1921, was appointed general manager on Jan. 1, 1925. The position he formerly held has been discontinued. Mr. Collett entered the railway field in 1906 as superintendent of the Muncie & Portland Traction Company, Portland, Ind. He remained with this company in that capacity for 6 years. He then took on the duties of claim agent for the County Traction Company and the Chicago & West Towns Railway, the successor of the County Traction Company. Here he remained for another 6 years, up to 1918. In that year he became superintendent of transportation and gave his attention for the next 3 years to bettering the details of carrying passengers. Then it was that he assumed

the rôle of general superintendent. The property of which he is now general manager operates 70 miles of line and connects Oak Park, River Forest, Maywood, Melrose Park, Cicero and other important places in the vicinity of Chicago.

Walter C. Slade Vice-President at Providence

Walter C. Slade is the new vice-president of the United Electric Railways, Providence, R. I. To this position he was promoted from that of superintendent of power and lines, which he assumed in September, 1915, when the local railway property at Providence was known as the Rhode Island Company.

During his last two years of service as superintendent of power and lines Mr. Slade's work was especially noteworthy. In addition to supervising the regular operation and maintenance of the power and line departments he had general supervision over the work of planning and constructing extensive

W. C. Slade

improvements on the power system involving the expenditure of slightly more than $2,000,000. These improvements involved an extensive modernization program in the power plant, the construction of two new substations, improvements in three more substations, the construction of additional overhead, an underground transmission circuit and the installation of a track circuit block signal system on a high-speed line.

His first position was with the General Electric Company, at Pittsfield, Mass., in the laboratory staff. He was born in Providence in 1885 and was graduated from Brown University with the degree of Ph.D. in 1907. Later he was graduated from the Massachusetts Institute of Technology.

V. W. Burley Appointed Assistant Manager at Binghamton

V. W. Burley, general superintendent of the Binghamton Railway, Binghamton, N. Y., was recently appointed assistant general manager by President Fuller with the approval of the board. In announcing the promotion of Mr. Burley, President Fuller said the details of the work of management had increased so rapidly within the last year that he could not give them sufficient attention, and, further, that every assignment given to Mr. Burley in the last few years had been handled with distinction and good results to the company and with satisfaction to him.

The new assistant general manager has been general superintendent only since April, 1923. He entered the employ of the Binghamton Railway as a conductor in 1910. For 10 years before that he had been connected with the Pennsylvania Railroad. It is believed that he, above all other people, is best suited to fill the position of assistant general manager, having fulfilled the duties of conductor, inspector, dispatcher, claim agent and superintendent of transportation.

F. M. Black Made Vice-President at Winnipeg

F. M. Black, Provincial Treasurer of Manitoba, has been offered the specially created position of vice-president in charge of finances of the Winnipeg Electric Company, Winnipeg, Canada. Mr. Black is regarded as one of the outstanding financial men in western Canada, where he has been held in high repute for a number of years. In 1916 and 1917 he was president of the Calgary Board of Trade and in 1917 was also a member of the Alberta Public Utility Commission. For some time during the war he was on the staff of the Food Control at Ottawa, and later became associated with the United Grain Growers' Association. This last position he relinquished when he resumed his position as Provincial Treasurer.

In announcing the important appointment, A. W. McLimont, vice-president and general manager of the Winnipeg Electric Company, said that in view of the growth and development of the business of his company and its subsidiaries during the past few years and the increased activities required in connection therewith, it had been considered advisable to have associated with the company some person of broad financial experience who could devote all of his time to that branch of the company's affairs. It was with this object in view that the position of vice-president was created for Mr. Black and accepted by him.

Premier Bracken of Manitoba has expressed the regret of the government in losing so able a minister as Mr. Black, who handled the finances of the province during a most difficult time and had thereby won for himself great appreciation.

John T. Lyle, Jr., is first vice-president of the Meridian Light & Railway Company, Meridian, Miss., succeeding S. B. Irelan.

J. H. Bruce, traffic manager of the London County Council Tramways, London, England, who was appointed to take over the management of the system until Dec. 31, following the retirement of A. L. C. Fell, will be continued as operating manager until April 30 next.

Obituary

John Z. Murphy

John Z. Murphy, electrical engineer for the Chicago Surface Lines, Chicago, Ill., died Jan. 17 at Phoenix, Ariz., where he had gone to recuperate his health. He had been connected with surface railway operation in Chicago nearly 40 years. Mr. Murphy began his engineering career with a primitive mode of transportation—water. This connection was with the old Michigan & Illinois Canal, but shortly thereafter his engagements widened to include other canals and to embrace railroads and public works. In 1889 he became chief operating engineer for the West Chicago Street Railway and subsequently was noted for his work in the construction of tunnels under the Chicago River.

In other words, from 1876 to 1889 Mr. Murphy was continuously engaged in engineering work on railways, canals and public enterprises through-

J. Z. Murphy

out the Middle West. Problems in marine engineering also received much attention and his years were busy ones.

As the engineer in charge of the Rockwell and Madison Streets power house for the West Chicago Street Railway he successfully surmounted some very serious obstacles in construction and won the admiration of members of his profession. When the power house machinery was accepted Mr. Murphy returned to the lakes in 1889 as chief engineer for the Marrinet Barge Company.

In 1892 the late John M. Roach appointed Mr. Murphy chief engineer for the West Chicago Street Railway. In 1908 he was made chief engineer for the Union Traction Company. In 1914, following unification of surface lines, he became electrical engineer for the Chicago Surface Lines, a post he held at the time of his death. He was also a member of the Chicago board of supervising engineers.

As long ago as October, 1911, the Chicago *Examiner* in a series of articles on men who had done most for Chicago said that in the engineering profession no man stood higher in that city than Mr. Murphy, engineer in charge of the vast work of reconstruc-

tion and rehabilitation of the West Chicago Street Railway and the Union Traction Company and who had been continued in his high position by the Chicago railways. That paper said:

In the upbuilding of the West where today stand the giant enterprises representative of the prowess of our age there have been required men of high courage, of broad views and of inventive minds to plan and to execute, and Chicago and the West owe a debt to the engineers, civil, mechanical and electrical, whose genius has made our present achievements possible.

And in that select company the *Examiner* said Mr. Murphy stood very high.

Mr. Murphy was born in Chicago in 1857.

Secretary of Cleveland Fare Box Company Dead

Sara E. Brannon, secretary-treasurer of the Cleveland Fare Box Company since its organization in 1911, died Jan. 5, following a wound received while she was on a mission of mercy. In 1908 Miss Brannon was employed by W. T. Cook as secretary. He was at that time general superintendent of the Municipal Traction Company, Cleveland. She continued with him in that capacity under the receivership that followed the Municipal Traction Company. It was a few years later when the Cleveland Fare Box Company was organized that she went to that company as secretary-treasurer and she continued in that capacity up to the time of her death. Miss Brannon was 43 years old. She went to Cleveland in 1904, working for the next 4 years with the Land Title Abstract & Trust Company. She was born in Mageetown, Pa., and attended college in Meadville.

John M. Johnson, traffic supervisor of the Columbus Railway, Power & Light Company, Columbus, Ohio, died recently. He had been identified with the company for 32 years.

Charles Barnes Beckwith, president of the Beckwith-Chandler Company, New York, N. Y., and Newark, N. J., varnish and paint manufacturers who specialize in products for steam and electric railways, died suddenly on Jan. 20 of heart disease, at the age of 62.

Charles H. Clark, president of the Waterbury & Milldale Tramway, Waterbury, Conn., died on Jan. 17, aged 92. Mr. Clark was president of the Southington Bank & Trust Company and the Clark Brothers Bolt Company. He served in the Legislature and was the oldest active bank president in Connecticut.

Arthur D. Prince, senior assistant division engineer of the Board of Transportation of the City of New York, died on Jan. 20. Mr. Prince was born at Glen Cove on Oct. 21, 1870. He was graduated as a civil engineer from Columbia in 1899 and joined the engineering staff of the Metropolitan Street Railway, New York. Later he went into the Department of Public Works and the Department of Street Improvements in New York City. He was assistant engineer in charge of highway construction in the Bronx. In 1900 he became assistant engineer to the old Public Service Commission.

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Standard Forms Adopted

Standard invoice, purchase order and inquiry forms for recommended use by all branches of American industry and commerce were adopted by a national conference held under the auspices of the Division of Simplified Practice, Department of Commerce, at Washington, D. C., Jan. 14. Forty-five organizations were represented at the conference. These included the producer, distributor and consumer as well as the wholesaler and retailer in the leading commercial fields.

The movement started in 1919, when 417 associations were invited by the National Association of Purchasing Agents to a conference in Philadelphia to discuss the subject. For 2 years thereafter a joint committee representing the Railway Officers' Accounting Association, the American Railway Association, the National Association of Cost Accountants and the National Association of Purchasing Agents studied the problem from every angle. In 1921 a national standard invoice form was adopted by these four associations for recommended use by its members. Since that time a number of other large associations have officially indorsed it and have put it to actual use.

A survey of a large number of representative firms showed an estimated average saving of $620 a year if all invoices received were standardized. This would amount to an aggregate annual saving of $15,000,000 in all lines of American business. Since this figure applies only to the standard invoice, the conference has started a movement which will involve a much larger figure through the standardization of purchase order and inquiry forms as well.

Copies of the standard invoice, inquiry and purchase order forms as adopted by the conference may be secured upon application from the Division of Simplified Practice, Department of Commerce, Washington, D. C., or from the National Association of Purchasing Agents, Woolworth Building, New York, N. Y.

Virginian Railway Locomotive Inspected

An inspection by officials of the Virginian Railway, American Locomotive Works and the Westinghouse Electric & Manufacturing Company recently was made of one of the new Virginian electric locomotives. It was built by the American Locomotive Works and had just arrived at East Pittsburgh, where the electrical equipment was installed by the Westinghouse company.

This is the first unit to be built in connection with the $15,000,000 electrification project of the Virginian Railway to electrify 134 miles of line, including 213 miles of track, lying between Roanoke, Virginia, and Mullens, W. Va. Three motive power units comprise one complete locomotive, making it the largest in the world.

Two Big Wheel Companies Merge

The National Car Wheel Company and the Southern Wheel Company were merged on Jan. 1, 1925, and are now operating under the name of the Southern Wheel Company. The plants are located at Pittsburgh, Sayre, Pa.; Cleveland, Rochester, St. Louis, Birmingham, Atlanta, Savannah and Portsmouth, Va. The company manufactures chilled iron wheels at all these plants, and in addition mine cars and parts at St. Louis and Birmingham, also miscellaneous gray iron castings at Pittsburgh. The general offices are in the Keystone Building, Pittsburgh. This company is a subsidiary of the American Brake Shoe & Foundry Co.

Bituminous Production Large

Figures compiled by the Department of the Interior indicate that the total output of soft coal for 1924 will be approximately 467,700,000 net tons. This is nearly 100,000,000 tons less than was mined in 1923, but is in excess of the production for 1919, 1921 or 1922. In comparing this estimate with the final figures for earlier years, however, it must be remembered that the preliminary estimates are usually from 2 to 3 per cent too low. It is possible, therefore, that final figures may show a total for 1924 as high as 480,000,000 tons. The production by years is given in the accompanying table.

ESTIMATED PRODUCTION OF BITUMINOUS COAL (Net Tons)

Calendar Year	Production
1918	579,386,000
1919	465,860,000
1920	568,667,000
1921	415,922,000
1922	422,268,000
1923	564,157,000
1924 (preliminary)	467,700,000

Metal, Coal and Material Prices

Metals—New York	Jan. 20, 1925
Copper, electrolytic, cents per lb.	14 75
Copper wire base, cents per lb.	17.25
Lead, cents per lb.	10 00
Zinc, cents per lb.	7 97
Tin, Straits, cents per lb.	56 00
Bituminous Coal f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$4.30
Somerset mine run, Boston, net tons	2.125
Pittsburgh mine run, Pittsburgh, net tons	1.95
Franklin, Ill., screenings, Chicago, net tons	1.95
Central, Ill., screenings, Chicago, net tons	1.95
Kansas screenings, Kansas City, net tons	2.50
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.	$7 25
Weatherproof wire base, N.Y., cents per lb.	20.00
Cement, Chicago net prices, without bags	2.10
Linseed oil (5-lb. lots), N. Y., per gal.	$1.18
White lead in oil (100-lb. keg), N. Y., cents per lb., carload lots	0.1347
Turpentine (bbl. lots), N. Y., per gal.	0.93

Rolling Stock

Durham Public Service Company, Durham, N. C., it is reported, has ordered three Mack railway-type buses.

Richmond Light & Railroad Company, Staten Island, N. Y., has just purchased two double-truck Russell snow sweepers. One was delivered just in time to be of great service during the recent heavy snowfall.

Asheville Power & Light Company, Asheville, N. C., has received five of the 22 new cars ordered some time ago. The remainder will be shipped as soon as possible. All the cars are of the latest one-man type, with up-to-date devices. They are being made by the Brill Company, Philadelphia. Two new buses are also expected by the company for the West-Asheville line.

Track and Line

Coast Cities Railway, Asbury Park, N. J., has been granted permission to install a loop at Cookman Avenue and Main Street, Asbury Park.

Williamsport Passenger Railway, Williamsport, Pa., plans to lay an additional track on Market Street, to install in Markey Square curves connecting Market Street lines; a connecting track to East and West Third Streets; a single track in Washington Street to connect at Market. The new track amounts to almost a mile. Requests are being made to the City Council.

Altoona & Logan Valley Electric Railway, Altoona, Pa., in 1924 used 296 tons of new rails, paved 17,368 track feet, used 1,000 steel and 12,066 wooden ties and renewed 139 poles.

Dallas Railway, Dallas, Tex., during 1924 spent more than $1,000,000 for extensions, improvements, new equipment and paving, and added more than 9 miles of track to its system. Nearly 4 miles of this track represents new trackage, constructed during the year. Of the more than 9 miles of track added, 5.2 miles is accounted for by the taking over of the Trinity Heights line. The new trackage added to the system during 1924 represents a cost of about $200,000.

Asheville Power & Light Company, Asheville, N. C., will build a line from Biltmore Avenue out the Black Mountain highway, a distance of 6 miles. The golf course will lie on one side of the new line and the recreation park on the other. The extension of the railway on the Black Mountain highway, together with the purchase of real estate, will represent an investment of many thousands of dollars.

New York, N. Y. — The Board of Transportation recently directed that bids be advertised for the construction of a portion of the Washington Heights subway route under the proposed Broadway Temple at 173d Street and Broadway. The bids are to be received and publicly opened Feb. 6, 1925.

Intercity Terminal Railway, North Little Rock, Ark., will extend its East Second Street line to the city limits of North Little Rock. Persons residing in the section have agreed to relieve the company of the cost of paving between the rails and 18 in. on either side of the new line.

Shops and Buildings

San Diego Electric Railway, San Diego, Cal., plans to construct extensive new shops. The new building will cover an entire square block and will furnish additional space for machine shops, paint shops, storehouses, carpenter shops and new garages for the buses. Additional space for the storage of heavy road equipment, material yards, shop offices and a lot of new electrical and mechanical devices for the handling of materials and repair work are provided for.

Community Traction Company, Toledo, Ohio, will abandon the Dorr and Galena Streets carhouses on Feb. 1. The Dorr carhouse will be used for storage of inactive cars. The Galena carhouse is in need of repair and will be razed. The abandonment will mean a saving of $15,000 a month in operation of the system.

New Incorporation

Ashtabula & Shore Line Railway, Ashtabula, Ohio, was recently incorporated with a nominal capital of $10,000 by Fred R. Moseley and associates. The company will operate a belt line electric railway, connecting the various steam roads entering the city.

Trade Notes

George E. Doke, engineer of materials and equipment tests of the New York Central Railroad, at New York, has resigned, effective Feb. 1, and has been elected president of the Association of Manufacturers of Chilled Car Wheels, with headquarters at Chicago. He succeeds George W. Lyndon, who died on Oct. 7, 1924. From 1897 to 1900 Mr. Doke served on the Indiana, Illinois & Iowa, now a part of the New York Central Railroad. Later he served on the Lake Shore & Michigan Southern. In 1916, following a consolidation of the Lake Shore & Michigan Southern with the New York Central, he was promoted to assistant engineer of tests in charge of material inspection for the car and locomotive departments of the New York Central system. Four years later he was again promoted to engineer of materials with headquarters at Cleveland, Ohio, in charge of materials inspection and the creation and development of material specifications. Two months later he was made engineer of tests of the New York Central Railroad in New York City. Since 1922 he has served as engineer of materials and equipment tests of the New York Central Railroad.

Roller-Smith Company, New York, N. Y., announces the appointment of W. H. Pugh as its representative in the northeastern part of Pennsylvania, with headquarters at its factory at Bethlehem, Pa. Until recently Mr. Pugh represented the Roller-Smith Company in the territory immediately adjoining Bethlehem, but on Jan. 1 his territory was enlarged. Before Mr. Pugh became associated with the Roller-Smith Company, many years ago, he was superintendent of the Columbia Meter Company at Indianapolis, which concern was later taken over by the Roller-Smith Company.

Norma-Hoffmann Bearings Corporation, Stamford, Conn., announces that its factory and general offices have been moved to a new plant at Stamford. The Long Island City plant is discontinued and all shipments will now be made from the new address.

Massey Concrete Products Corporation has established a district sales office in the Dixie Terminal Building, Cincinnati, Ohio. This district will comprise the states of Ohio, Indiana, Kentucky, West Virginia, and a part of Pennsylvania. W. Lyle McDaniel has been appointed resident manager of this district.

Joseph W. Irwin, until recently president of the Mitchell Spring & Manufacturing Company, Johnstown, Pa., has resigned to become connected with his former associates as general superintendent of the Fort Pitt Spring & Manufacturing Company, Pittsburgh, Pa.

O. L. Chapman has joined the sales organization of the Scott Valve Manufacturing Company, Detroit. Mr. Chapman will devote his time to the application of valves to manufacturing plants and similar lines of industry.

New Advertising Literature

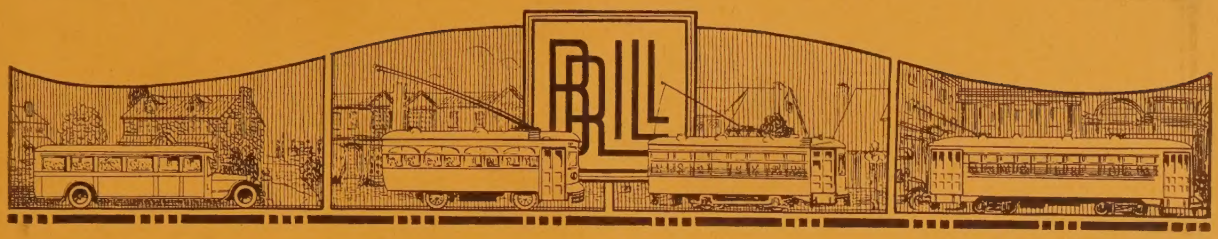
Portland Cement Association, Chicago, Ill., has issued a 300-page volume entitled "History of the Portland Cement Industry in the United States." The book is illustrated and the material is arranged in an instructive way for the layman as well as for the technical man.

Combustion Engineering Corporation, New York, N. Y., has issued a bulletin describing a stoker which its associates in England have installed throughout the British Isles and continental Europe. It possesses several features which are unusual in this country.

Conveyors Corporation of America, Chicago, Ill., has issued a broadside showing the newly designed American monorail cable conveyor. Its corps of engineers has been working on the design of this equipment for several years. The folder contains illustrations.

Sullivan Machinery Company, Chicago, Ill., has just published booklet 126, entitled "You Can Do It Quicker with Air." This booklet has 60 illustrations of rock drilling, concrete breaking, asphalt cutting, digging clay, riveting steel work, drilling wood and metal, sand blasting, spray painting, and other uses of compressed air, and features the Sullivan portable air compressors and air equipment used with them. Bulletin 76-E, "Portable Electric Hoist," describes the Sullivan single-drum and double-drum portable electric hoists at 6½ hp., 2,200-lb. vertical lifting capacity with single line.

Condit Electrical Manufacturing Company, Boston, Mass., has issued a folder describing its type N-4 oil motor starter.



Phila. & West Chester Trac. Co's.

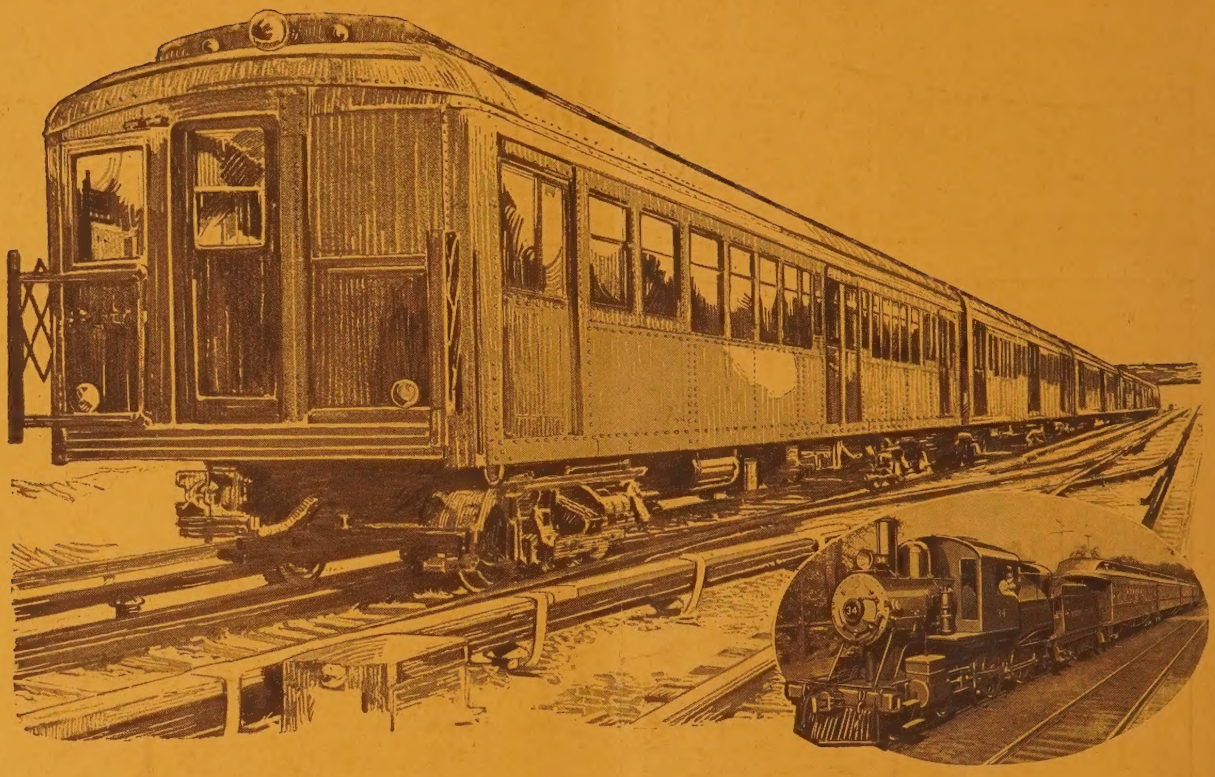
New High-Speed Cars

Ten Center-entrance Center-exit cars, of the railway company's standard design, were recently delivered to the Philadelphia & West Chester Traction Co. These new cars, mounted on Brill High-speed Trucks, 27-MCB-2X, are noted for their smooth and comfortable riding action, to which their general popularity with the public may be largely attributed.

Seating accommodations are provided for 62 passengers; the cars measure 48 feet long overall, 8 ft. 7 in. wide over posts, and equipped with quadruple 50 H.P. motors weigh 59,000 lb.

Catalog No. 277 contains a complete line of modern transportation equipment.

THE J. G. BRILL COMPANY
PHILADELPHIA, PA.
AMERICAN CAR CO. ST. LOUIS MO. — G.C. KUHLMAN CAR CO. CLEVELAND, OHIO. — WASON MANF'G CO. SPRINGFIELD, MASS.



Present Steam Equipment

Staten Island roads electrify

to meet exacting traffic demands

In order to give their suburban passengers the most generous measure of comfort and speed, the Staten Island Rapid Transit Railway Company and Staten Island Railway Company, subsidiaries of the Baltimore & Ohio, are electrifying 34 track-miles.

Eighty steel cars, each seating 72 passengers, will be operated in multiple-unit trains at speeds up to 50 miles per hour. They will provide the reliable, fast and frequent service necessary to and from the New York municipal ferries and in connection with the ferries operated by the Baltimore & Ohio between Tottenville and Perth Amboy, N. J.

200-h.p. direct current motors, type GE-282, with PC-10 Control were specified for this important electrification. The motors will operate at 600 volts.

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GENERAL ELECTRIC

GENERAL ELECTRIC COMPANY, SCHENECTADY, N. Y., SALES OFFICES IN ALL LARGE CITIES